Inter-American Development Bank
Banco Interamericano de Desarrollo
Latin American Research Network
Red de Centros de Investigación
Research Network Working Paper #R-481

Peruvian Privatization: Impacts on Firm Performance

BY

Máximo Torero

December 2003

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

Torero Cullen, Máximo.

Peruvian privatization : impacts on firm performance / by Máximo Torero.

p. cm. (Research Network Working papers ; R-481)
Includes bibliographical references.

1. Privatization--Peru--Evaluation. 2. Employment (Economic theory)—Effect of Privatization on. I. Inter-American Development Bank. Research Dept. II. Latin American Research Network. III. Title. IV. Series.

338.61 T72--dc21

Inter-American Development Bank
1300 New York Avenue, N.W.
Washington, DC 20577

This paper is part of the Latin American Research Network project "Costs and Benefits of Privatization in Latin America." The terms of reference for the project can be found on the internet at: http://www.iadb.org/res/laresnetwork/studies/st70tor.pdf

The Research Department (RES) produces a quarterly newsletter, *IDEA (Ideas for Development in the Americas)*, as well as working papers and books on diverse economic issues. To obtain a complete list of RES publications, and read or download them please visit our web site at: http://www.iadb.org/res

Abstract*

In the nearly ten years since Peru privatized major State Owned Enterprises (SOEs), the overall impact of the process is not yet clear. This paper analyzes the impact of privatization through a detailed statistical and econometric analysis of first difference (the difference between pre- and post-privatization performance), and second difference (change in performance of privatized firms relative to the change in performance of SOEs) of several indicators on profitability, operating efficiency, employment, leverage and convergence. The results, which showed that privately owned firms are more efficient and more profitable than otherwise comparable state owned firms, were consistent with previous literature. In the case of the most competitive sector, the financial system, the newly privatized banks converged towards the leading private banks over time. While the impact of privatization on employment is negative in the short-run, there are more positive impacts in the long term, especially since SOEs traditionally hire employees for political rather than technical reasons. This paper demonstrates that, as the result of privatization, there is a significant increase in indirect employment through services and significant growth of total employment—both direct and indirect.

JEL: L970, L960, L950, L500, L430, D600

Key Words: Privatization, firm performance, and regulation.

* Máximo Torero is a Senior Researcher at Grupo de Análisis para el Desarrollo.

This paper has been prepared for the project "Costs and Benefits of Privatization in Latin America" of the Inter-American Development Bank's Latin American Research Network. Dean Hyslop gave valuable advice on the econometric analysis of these results and Florencio López-de-Silanes, Alberto Chong, Alberto Pascó-Font and all the participants in the IDB Research Network on Costs and Benefits of Privatization offered numerous and helpful comments. The author is also indebted to the enormous effort and support of Virgilio Galdo throughout this project, as well as to his remarkably talented team of research assistants: Daniel Oda, Jorge de la Roca, Gissele Gajate and Linette Lecussan. Finally, the author thanks the Comisión de Promoción de la Inversión Privada (COPRI) for granting access to the White Books of all the privatized firms.

Send correspondence to mtorero@grade.org.pe.

1. Introduction

In the last two decades, countries around the world have embarked on major privatization programs, yet many remain reluctant to privatize while still more have had to halt ongoing processes of privatization. This is particularly true in developing countries, where State-Owned Enterprises (SOE) still account for more than 10 percent of gross domestic product, 20 percent of investment and about five percent of formal employment (Kikeri, Nellis, and Shirley, 1994). The aversion to privatization appears to be associated with public distrust of the privatization process. Unions and other traditional opponents of privatization have argued that it results in layoffs and poorer services. Political leaders, meanwhile, fear that the higher profitability of private companies comes at the expense of the rest of society, especially during the difficult transition period from state ownership to private ownership.

The transfer from the public to the private sector (Vickers and Yarrow, 1988) necessarily implies a change in the relationships between those responsible for the firm's decisions and the beneficiaries of the profit flows (the social view and the agency view). In general, the transfer of property rights leads to a different structure of management incentives, causing changes in managerial behavior, company performance, and quality of service in terms of access and use, but in the words of Jean-Jacques Laffont and Jean Tirole (1993), "theory alone is thus unlikely to be conclusive in this respect." Empirical work, then, is crucial.

Nevertheless, there is still little empirical knowledge about how well privatization has worked. There are difficult methodological problems as well as special problems with data availability and consistency. Furthermore, the possibility of sample selection bias can arise from several sources, including a government's desire to sugarcoat the process by privatizing the healthiest firms first. Megginson and Netter (2001) carried out a very detailed review of 22 studies on non-transitional economies and concluded that Galal, Jones, Tandon, and Vogelsang (1994), La Porta and López-de-Silanes (1999), and the studies summarized in D'Souza and Megginson (1999) are the most solid and persuasive supporting the proposition that privatization improves the operating and financial performance of firms. The author considers La Porta and López-de-Silanes (1999) the finest study of an individual country, since it examines nearly the entire universe of Mexican privatizations.

These studies, especially La Porta and López-de-Silanes (1999), investigate whether companies increase profits after privatization, whether privatization inflicts significant social losses, and, if so, through which channels. They conclude that the improved performance of

privatized firms is the result of significant restructuring efforts, not of market power exploitation, or massive layoffs and lower wages. In other words, firms undergo a harsh restructuring process following privatization and do not simply mark up prices and lower wages, as many economists have predicted. Deregulation, particularly the removal of price/quantity controls and trade barriers, is associated with faster convergence to industry benchmarks. The author suggests that the additional revenues and increased tax revenues the government receives from privatizations are probably enough to offset the cost of job losses to society.

Newly-privatized firms cut employment, usually reducing the roll of white and blue-collar workers by nearly half. These numbers may actually underestimate the effects of privatization, since in the years before, most companies have already trimmed payrolls in order to prepare for divestiture. These findings suggest that transfers from workers to shareholders play a role in the success of privatization. However, productivity gains resulted in large real wage increases of 114 percent in the post-privatization period.

La Porta and López-de-Silanes showed, for example, that privatized firms increased sales 54.3 percent, despite workforce reductions and only modest increases in capital. Surprisingly, prices rose only 2.9 percent relative to the Producer Price Index. La Porta and López-de-Silanes also decomposed reported increases in profitability. Approximately 10 percent of the gain in profits was attributable to higher prices and 33 percent to worker layoffs, while productivity gains accounted for the remaining 57 percent. Some of the social effects of higher prices and layoffs were offset by corporate taxes, which absorbed slightly more than half of the gains in operating income.

In this study, the author follows a similar approach to La Porta and Lopez-de-Silanes (1999) by collecting information on nearly the entire population of privatized firms in order to evaluate the impact of Peruvian privatization. The author then compares the performance of those firms with the remaining SOEs and, when possible, with industry-matched private firms. Through this method, the impact of privatization on profitability ratios, operating efficiency ratios, labor indicators, and capital deepening indicators is analyzed. Even though the ultimate effect of changes in management incentives depends on the competitive and regulatory environment in which a given firm operates, it is argued that the degree of market competition and the effectiveness of regulatory policy has more important effects on performance than does change of ownership (Vickers and Yarrow, 1988). This is extremely important in the case of the Peruvian privatization process because it was accompanied by large-scale sectoral reforms in which competitive structures and independent regulatory

agencies were established to monitor and promote competition in each sector. Therefore, variables needed to identify the roles played by the regulatory agencies and the competitive forces that determine firm performance (existence of a regulatory framework, autonomy of the regulatory agency, etc), are taken into account in the analysis.

Peru's privatization experience was rated one of the early success stories in Latin America. The privatization process, begun by then-President Alberto Fujimori, was launched as part of a rigorous process of stabilization and structural reform initiated in response to the crisis in the Peruvian economy. At the time, inflation had reached an annualized rate of 36,000 percent, and per capita income had dropped to its lowest level in 30 years. Though privatization was not part of the initial set of reforms, it soon became a central plank of the overall reform program.

By 2001, the privatization process involved 252 transactions, including 42 SOEs, brought US$9.2 billion in revenue (including capitalization) to the Treasury, and mobilized an additional US$11.4 billion in new investments. Nevertheless, Peru's considerable success in attracting private participation and capital focused on a few sectors such as telecoms, electricity, banking, hydrocarbons and mining. Unlike some countries, such as Argentina and Bolivia, there has been virtually no private participation in the transportation, water, or sanitation sectors. Furthermore, as is the case in other countries, public support for privatization has been declining steadily—from 65 percent in May 1992 to less than 25 percent by 2000. This decline has practically brought the privatization process to a halt. Written during a period of anti-privatization sentiment, this report is of special importance because it aims to analyze empirically the impact on performance of privatized SOEs.

The study is organized as follows. After the introduction, the second section reviews the privatization process and its principal results. The third section summarizes the empirical methodology followed by the author, and the fourth section details the database they developed. The fifth section presents calculations of the differences in pre- and post-privatization performance, difference in difference comparisons for which control groups were developed, and a panel data regression analysis of the static and dynamic performance of privatized firms relative to SOEs. The final section offers the authors' conclusions.

2. The Privatization Process

At the beginning of 1990, Peru faced its worst macroeconomic situation ever (see Table 1). The country had never experienced such large and prolonged periods of inflation and recession. The economic model implemented in response to the crisis assigned the state a

central role in economic policy-making. The policies adopted by the government were not up to the challenge at hand: public expenditure and public internal credit rose impressively, price controls and subsidies were established, tariffs on public services were fixed, and exchange rate controls were set. These policies translated into a persistent fiscal imbalance and a considerable drop in tax revenues. In addition, the country faced a high underemployment rate and a striking decline in financial intermediation.[1]

The macroeconomic crisis affected Peru's poorest citizens, around 43 percent of the 1990 population, most of all. The situation worsened as public services, such as education and health, deteriorated. Additionally, the end of the decade saw an increase in informal economic activity, delinquency, drug trafficking and terrorism. Furthermore, in 1990, Peru reached record underemployment (86.4 percent), while unemployment was around 8.3 percent and formal employment barely reached 5.3 percent.[2]

Table 1.
Main Macroeconomic Indicators

% Change in GDP (at Constant Prices) 1987-1992	Annual Inflation (%) 1987-1992	Annual Inflation (%) 1990	Depreciation of the Real Effective Exchange Rate (%)
-4.9	733.1	7,649.60	-2.04

Source: Crisis and Reform in Latin America; Sebastian Edwards (World Bank).

In this context, public enterprises were characterized by inefficient provision of goods and services, ambiguous objectives, extensive intervention by politicians, decapitalization of investment resources, and a lack of fresh investment resources. Not surprisingly, then, public firms registered accumulated losses of more than US$4 billion in 1989-1990.[3] In an effort to reverse this situation, the Peruvian government decided to design an attractive normative and institutional framework for the purpose of promoting private investment as the main vehicle of economic growth. One of the key aspects of this new framework was a program to privatize public sector companies in 1991.

In February 1991, the privatization process was launched with the enactment of Supreme Decree (SD) 041, which regulated and restructured the managerial activity of the State, even though the State was limited to managing no more than 23 companies. In

[1] According to Apoyo (2002), during the second semester of 1985 the amount of banking deposits reached 23 percent of GNP, while the same ratio fell to 5 percent in May 1990. Also, a similar drop occurred in the net internal credit of the banking system to the private sector (interest rates rose between 200 and 400 percent annually in real terms).
[2] These figures are for the Lima metropolitan area. Source: Perú en Números 1991, Cuánto S.A.
[3] Apoyo (2002).

November 1991, the government extended more active and decisive support for the privatization process by enacting Legislative Decree (LD) 674, also known as the Promotion of Private Investment in State Companies. LD674 introduced the Commission for the Promotion of Private Investment (COPRI) and the Special Privatization Committees (CEPRIs), as well as private investment promotion schemes, which included sales of stocks and assets, service provision, concessions, and other items. In order to give more dynamic and political support to the process, President Fujimori appointed five state ministers to lead COPRI. These ministers were in charge of the general management of the privatization process; they had to establish the policies and objectives of the process, appoint CEPRIs to particular processes, and approve the most important decisions. CEPRIs were put in charge of the planning and execution of individual privatization processes.

One of the most important laws enacted was LD662, or the "Law of Foreign Investment Promotion," which mandated equal treatment of national and foreign capital. This law permitted foreign investment in all economic sectors and its execution through any legal administrative means.

Diverse laws were then instituted in 1992 to facilitate the privatization process. The State was authorized to grant the safeties and guarantees necessary to protect foreign acquisitions and investments. Foreign investors were also granted facilities for the payment of taxes and debts owed by SOEs in the privatization process. In some cases, these commitments were suspended until the end of the process.

In 1993, all of these reforms were written into law with the approval of the new Political Constitution. The new Constitution included the promotion of free private initiative, the establishment of equality between national and foreign investors, the encouragement of competition and equal treatment for all economic activities, and the guarantee of the possibility of the signing of Stability Agreements between private investors and the State. In addition, the State subscribed to many International Agreements for the protection of foreign investment and conflict solution through international arbiters.

Together with the launching of the privatization program, the government undertook another set of structural reforms. Through these reforms, the government promoted market-based competition and free international trade, installed policies to create a more flexible labor market, liberalized the financial system, eliminated price controls, and implemented sector reforms for the deregulation of markets. All the reforms carried out were complementary and necessary to the privatization program. In so doing, the government recognized that adequate regulatory and institutional frameworks and a competitive market

for the product, and not just ownership, were determining factors in the success of the privatization process.

Peru's privatization scheme began in earnest between the months of November 1991 and February 1992. Its main objective was simple: privatize as many public companies as quickly as possible. The initial tasks carried out were defining privatization methods, prioritizing the public enterprises to be privatized (which depended on their importance and the ease with which they could be privatized), and creating the CEPRIs.[4] The most common practice adopted for privatization was the public auction, due to its transparent and competitive scheme.

In the following years, the design of an appropriate juridical-legal framework for the development of private investment continued. One particularly important law provided for the regulation of immigration applications and facilitated the nationalization of foreign citizens who wanted to provide capital and invest in Peru.

The results of the privatization process were outstanding. Beyond the simple transfer of assets, companies were purchased and significant amounts of investment were committed (see Table 2 for details). In 1991, two public companies were privatized (Sogewiese Leasing and Buenaventura Mine). In 1992, under an operational COPRI and various CEPRIS, ten SOEs were privatized, drawing in revenues of US$208 millions and US$706 million in projected investment. In 1993, the process gathered momentum and 13 companies were privatized for a total of US$317 million and projected investment of US$589 million. The next year the government sold its natural monopolies in the telecommunications and electricity sectors, which resulted in US$2,579 million in revenues collected and a total amount of US$2,050 million of projected investments.

[4] In February 1992, the first 26 CEPRIs initiated their operations.

Table 2
Privatization Amounts ($ Millions)

YEAR	TRANSACTIONS					Projected Investment
	Sale of Shares/ Assets	Concessions	Options Rights/ Small Assets / Other	Capitalizations	Total	
1991	2.6				2.6	
1992	207.5		1.4		208.9	706.0
1993	316.7	20.7	6.5		343.9	589.3
1994	2579.2		4.7	610.8	3194.7	2050.0
1995	1089.0	6.6	9.1	120.1	1224.8	70.1
1996	2281.8	344.2	2.7	40.0	2668.7	2695.0
1997	447.1	99	8.8	126.4	681.3	706.2
1998	251.8	35.1	5.2		292.1	220.6
1999	286.3	10.9	3.1		300.3	166.6
Total	7462.0	516.5	41.5	897.3	8917.3	7203.8

Source: Commission for the Promotion of Private Investment (COPRI).

During 1995 and 1996, the privatization process accelerated and deepened. Sixty-four companies were privatized, producing revenue of US$3,370 million and investment commitments of US$2,765 million. This continued in 1997 when 25 more companies were transferred for US$447 million and projected investments of US$706 million. In 1998, the privatization process made way for the concessionary process of transportation infrastructure.[5] CEPRIs were created for the concession of airports, ports, road networks, and mobile telephone bands, among other facilities.

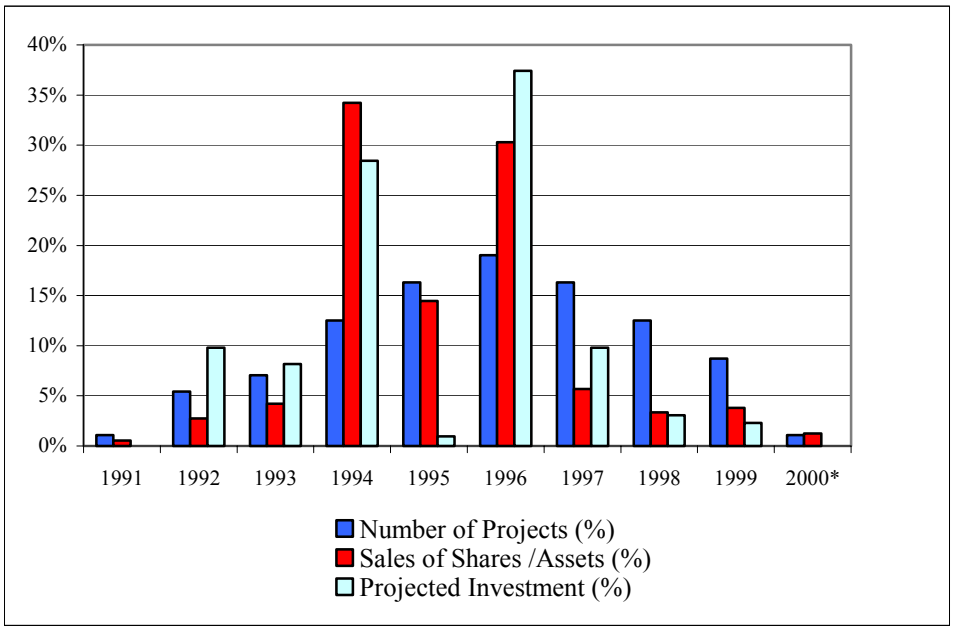
Between 1991 and 2001, Peru's privatization and concessionary processes generated revenues totaling US$9.5 billion (including capitalizations) and investment commitments of approximately US$11.45 billion. Graph 1 shows the evolution of the privatization process and the timeline for the transfer of nearly all public enterprises over the last 10 years. Graph 2 shows the revenues of the privatization process outlined by sector and company.[6] In regard to privatization practices, a total of 203 operations were carried out, representing US$7.85 billion of revenues and US$6.4 billion of investment commitments. Concessions raised US$726 million and US$4.60 billion, respectively.

Most of the privatization process occurred in the telecommunications, electricity, finance, mining and hydrocarbons sectors. Graph 3 shows how much privatization occurred

[5] This meant the creation of PROMCEPRI (Comission for the Promotion of Private Concessions) in 1997, which was later absorbed by COPRI.
[6] The slowdown between 1997 and 2000 is attributable to domestic and foreign factors: namely, the Russian crisis, "El Niño," the Peruvian political crisis, and others.

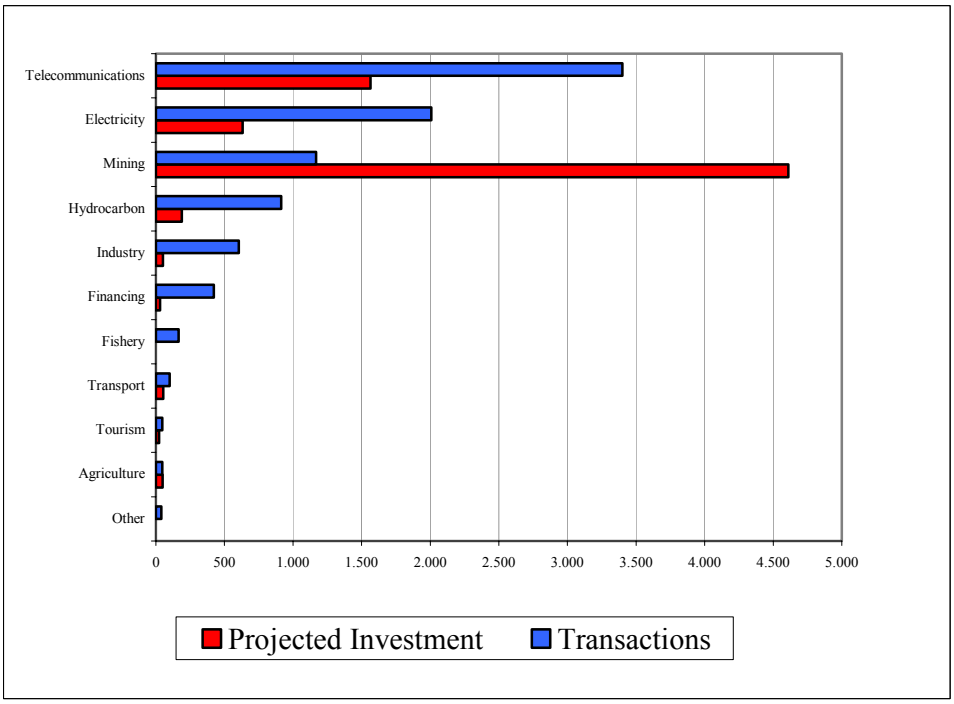
in each of the various sectors. Telecommunications and finance are already entirely privatized. In fact, telecommunications, electricity, finance and mining represent more than 75 percent of revenues collected by the Peruvian government. Nevertheless, to the present there has been virtually no private participation in the transportation, water, or sanitation sectors, and there are still sectors, such as agriculture, where much remains unprivatized.

Graph 1
Evolution of the Privatization Process



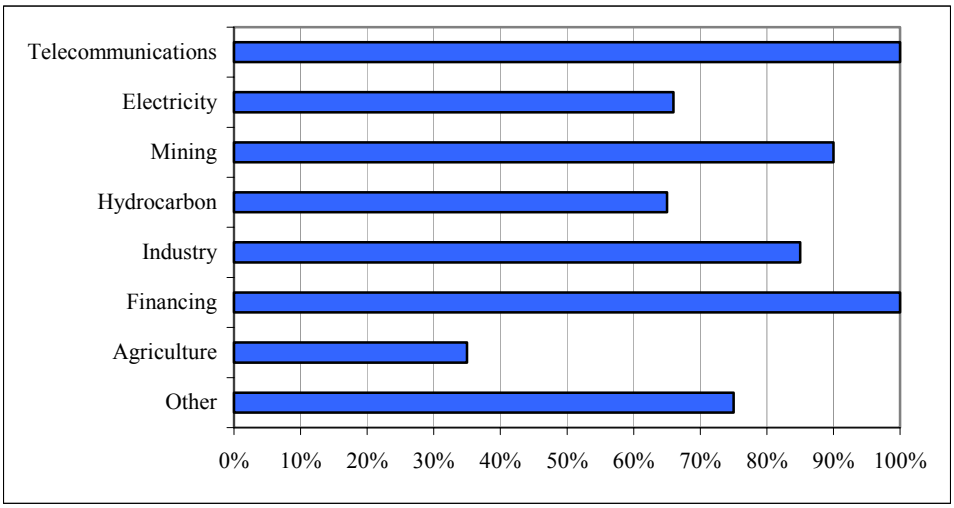
* Through June 30th.
Source: COPRI.

Graph 2
Privatization Revenues By Sector ($ Millions)



Source: COPRI.

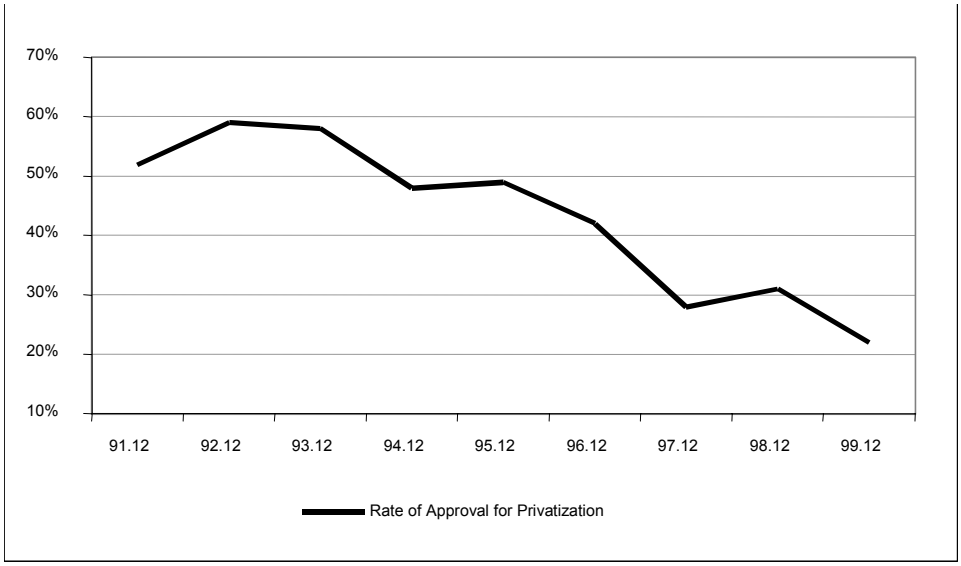
Graph 3
Privatization Process Progress (1991-2000)



Source: COPRI.

Despite the increase in government revenues and future investment commitments, public approval of the privatization process has decreased steadily, as shown in Graph 4. Therefore, in order to develop a complete picture of the impact of privatization on other fundamental areas of the Peruvian economy, the results of previous privatization studies must be complemented by a detailed analysis of the impact on firm performance.

Graph 4
Public Approval of Privatization



Source: COPRI.

This report evaluates the privatization process by analyzing the performance of all privatized firms in Peru. The paper studies a sample of firms representing 63 percent of the

privatized SOEs and 91 percent of the transactions involved in the privatization process. In addition, this study analyzes in detail the three sectors where most of the privatization took place: telecommunications, electricity, and financial services. Those three sectors accounted for 80 percent of the total revenue collected during the privatization process.

In the telecom sector, the Peruvian government sold both *Compañía Peruana de Teléfonos* (CPT) and *Empresa Nacional de Telecomunicaciones* (ENTEL). CPT provided basic telecommunication services in the Lima area, and ENTEL provided national and international long distance services, as well as local service for the rest of Peru. Divestiture took place in 1994 after an auction to the highest bidder. Using a first-price sealed bid mechanism, approximately 35 percent of CPT and ENTEL common shares (the minimum required to give the buyer control of the merger) were sold to Spain's *Telefónica de España*.[7] The results of the auction were impressive: Telefónica paid $2.004 million, far larger than the second highest bid of $800 million—a bid that was closer to the base price set by the government. Soon after buying both companies, *Telefónica de España S.A*. merged them and created *Telefónica del Perú S.A*. (TdP). Initially, TdP was granted a five-year national monopoly for the provision of lines, local calls, national long distance (NLD) and international long distance (ILD) throughout the country.[8] Simultaneously, the government created the Supervisory Agency for Private Investment in Telecommunications (OSIPTEL).

The privatization of CPT and ENTEL (now TdP) continued over the following years. In 1996, 65 percent of the company's shares were divided between minor shareholders (36.3 percent) and the Peruvian government (28.7 percent). The latter decided to sell 26.6 percent of its shares to small individual investors through a process known as *Sistema de Participación Ciudadana* (Citizen Participation System). In total, privatization in the telecom sector raised US$3.6 billion in revenues and US$1.56 billion in investment commitments for the government.

For the electricity sector, the government approved in 1992 the Law of Electric Concessions (DL 25844), which split power generation from electricity distribution and transmission. Power generation is a market open to competition, whereas transmission and distribution are usually considered natural monopolies. Between 1994 and 1997, the government privatized ten SOEs (five in distribution and five in generation) for a total of US$1.43 billion. There was also a significant investment commitment to increase the total

[7] Telefonica was no stranger to the acquisition of Latin American telecom providers, having already bought the former *Teléfonos de Chile*, currently known as CTC, and Argentina's ENTEL.

capacity of the privatized generation companies by 560 MW. At present, the privatized companies represent 64 percent of the total power generation capacity of the National Electric System and 79 percent of the distribution service.

The government also created two regulatory bodies for the electricity sector: the Supervisory Agency for Private Investment in Energy (OSINERG), and the Commission of Energy Tariffs (CTE), which was absorbed later by OSINERG. The privatization process in this sector is not yet concluded because one of the south's major generating enterprises, *Central Hidroelectrica del Mantaro*, and all of the region's distribution enterprises are not yet privatized. However, although the privatization is incomplete, the electric sector has become the second largest generator of revenues and investment commitments for the State: US$2.33 billion in revenue has been collected and US$716 million in investment commitments have been promised.

Water and sanitation is the only public utility where no privatization has occurred. Perhaps the only exception was the concession to the Italian Company Impregilo to operate wells and a water treatment plant in the river Chillón basin to sell water to the Lima water company. However, the government sought to improve the organization and management of the system by decentralizing it. This new reform gave municipalities control over water services. The only exception was the most important municipal water service, *Empresa de Servicio de Agua Potable y Alcantarillado de Lima* (SEDAPAL), which remains a state company. SEDAPAL was the only water-service provider included in the privatization program, but it has yet to be privatized. Despite this, the government has tried to improve SEDAPAL's services and coverage. Additionally, in 1992 the government created the *Superintendencia Nacional de Servicios de Saneamiento* (SUNASS), the National Office for Services of Sanitation, as the regulatory body for this sector. SUNASS is responsible for controlling the quality of the service provided, the tariff system and regulation, as well as intersector coordination, establishment of norms for the execution of investment plans and supervision of those plans.

With respect to the financial sector, on July 20, 1994, 99.86 percent of the government's shares in Interbanc were auctioned. The winner was a Consortium formed by International Financial Holding (Gran Caiman) and IFH Peru S.A., with the advice of Banco Osorno and La Union (Chile), for US$51 million (workers paid US$4.83 million for a total of 9.46 percent of the bank's shares). Interbanc branches Financiera Peruana (Interfip),

[8] Although the monopoly was initially scheduled to expire in June 1999, the TdP moved the expiration forward to August, 1st, 1998.

Internacional de Inmuebles and Empresas de Servicios Internacionales (Interserv) were also included.

Finally, on April 18, 1995, 60 percent of the shares of Banco Continental were awarded to the Consortium formed by Banco Bilbao Vizcaya (Spain) and the companies Inversiones Breca, Inversiones San Borja, Urbanizadora Jardin and Minsur (all belonging to the Brescia Group). In August 1995, in agreement with the Share Purchase Sale Contract of Banco Continental, 15,325,388 shares belonging to the State were transferred to Holding Continental S.A for US$32 million.[9] By July 21, 1998, the Peruvian government had managed to sell 19 percent of its remaining shares on the international and local markets.

3. Methodology

The analysis conducted in this paper determines, from a firm's perspective, whether the privatization of SOEs in Peru and other developing countries is desirable in terms of the performance of newly privatized firms. Following Boubakri and Cosset (1998), the paper tries to determine whether firms improve their performance after privatization. Firm performance was measured by profitability, operating efficiency, capital expenditures, output, employment and leverage. The following list, taken from Megginson, Nash and van Randerborgh (1994), shows details on the proxies for these performance measures as well as the predicted relationships.

Performance Measure		Proxies	Predicted Relationship
P(1)	Profitability	Return on Sales (ROS)=Net Income / Sales	$ROS_A > ROS_B$
		Return on Assets (ROA) = Net Income/ Total	$ROA_A > ROA_B$
		Return on Equity (ROE) = Net Income/ Equity	$ROE_A > ROE_B$
P(2)	Operating	Sales Efficiency (SALEFF)= Sales/Number of Employees	$SALEFF_A > SALEFF_B$
		Net Income Efficiency (NIEFF)=Net Income/Number of Employees	$NIEFF_A > NIEFF_B$
P(3)	Capital Investment	Capital Expenditure to Sales (CESA)= Capital Expenditures/Sales	$CESA_A > CESA_B$
		Capital Expenditure to Assets (CETA)=Capital Expenditures/Total Assets	$CETA_A > CETA_B$
P(4)	Output	Real Sales (SAL)=Nominal Sales/Consumer Price	SAL_A ? SAL_B
P(5)	Employment	Total Employment (EMPL)= Total Number of Employees	$EMPL_A < EMPL_B$
P(6)	Leverage	Debt to Assets (LEV)=Total Debt/Total Assets	$LEV_A < LEV_B$
		Long Term Debt to Equity (LEV2)=Long Term Debt/Equity	$LEV2_A < LEV2_B$

[9] This transaction corresponds to the shares not purchased by the workers of Banco Continental and Subsidiaries as part of their preferential right conferred by LD 674. In agreement with the contract, these shares had to be purchased by Holding Continental S.A. at the auction price. The reception of the duly subscribed share purchase sale contracts concluded on July 10. A total of 1,178 employees practiced their preferential right, acquiring a total 2,115,700 shares as follows: 379,667 shares were paid in cash for S/.1.8 million, and 1,736,033 shares were acquired through sales with installment credits for S/.8.2 million at an effective annual interest rate of 10.03 percent.

Based on these performance measures for most of the firms privatized or awarded in concession, the empirical approach consisted of two stages. In the first stage, a simple statistical analysis was executed to study the post-privatization changes in firms' performance. In the second approach, a regression analysis was performed controlling most of the differences between firms and variables, other than privatization, that could explain the performance of the firm.

The statistical analysis consisted of computing the performance variables for each company for a fifteen-year period (1986-2000). Secondly, the means for each performance variable (Y) for the pre-privatization and post-privatization periods were computed. Furthermore, to avoid any bias resulting from a pre-privatization restructuring of the firm, all years prior to the divestiture in which restructuring took place were excluded.[10] After the means were calculated, using differences from the sample counterpart of the privatization effect and the performance variables, the following was obtained:

$$\Delta \overline{Y} = [\overline{Y}^{\,postrpivatization} - \overline{Y}^{\,preprivatization}] \qquad (1)$$

The two-tailed Wilcoxon signed-rank test and the Hotelling test are then used to test for significant changes in performance variables after privatization. Nevertheless, both tests are based on the assumption that the distributions are normal. If the sample size is small and the true distribution of differences is far from normal, the stated probability levels may be significantly in error. Specifically, when looking at each individual firm, the central limit theorem can not be applied since the sample of years for each is small. For that reason, it is necessary to verify the normality of the series. Therefore, the Shapiro-Francia test for normality is used.

When the Shapiro-Francia test rejects the null hypothesis of normality, a non-parametric test, the Kolmogorov-Smirnov (K-S) statistic, is used to formally test the equality of the empirical hazards functions of the different pre- and post-privatization performance indicators.[11]

---

[10] The privatization year is the date on which the government sold, for the first time, a certain amount of shares.

[11] The test evaluates the closeness of the distributions $\lambda^{pre-priv}$ and $\lambda^{post-priv}$ by computing the least upper bound of all pointwise differences $|\hat{\lambda}^{post-priv}(x) - \hat{\lambda}^{pre-priv}(x)|$. The KS statistic can be written as:

$$D = \sup_x [|\hat{\lambda}^{post-priv}(x) - \hat{\lambda}^{pre-priv}(x)|]$$

The null hypothesis ($H_0 : \lambda^{post-priv} = \lambda^{pre-priv}$) is accepted if $\lambda^{post-priv}$ is sufficiently close to $\lambda^{pre-priv}$, in other words if the value of D is sufficiently small or smaller than the critical value at a certain significance level.

The above methodology is equivalent to considering the simplest possible model for capturing the effect over performance with no regressors; it can easily be derived so that performance depends only on the date of the privatization dummy,

$$Y_{i,t} = \alpha + \gamma \Pr ivatizatio n_{i,t} + u_{i,t} \qquad \mathrm{E}(u_{i,t} / \Pr ivat_{i,t}) = 0 \tag{2}$$

Nevertheless, the above result is likely to be biased for two reasons. First, the two groups may have different characteristics and, thus, different performance behavior. Second, the two groups of years may be subject to different shocks. Part of the differences in pre- and post-privatization performance patterns may simply be a result of these differences.

An alternative way to solve this problem is to develop a benchmark to control for these different characteristics and shocks. In this sense, a difference in difference measure was calculated for each economic sector in which privatization was important:

$$\Delta^2 \overline{Y} = [\overline{Y}^{\,post-priv^{year}} - \overline{Y}^{\,pre-priv^{year}}]^{priv.\,firms} - [\overline{Y}^{\,post-priv^{year}} - \overline{Y}^{\,pre-priv^{year}}]^{notpriv.\,firms} \tag{3}$$

The main caveat of the difference in difference measure is the lack of an appropriate control group with which to compare the difference in performance of the privatized firms. It is not possible to use an optimal matching methodology such as propensity scores, as detailed in Rubin (1974, 1983), Heckman and Smith (1995), Heckman, Ichimura, Smith, and Todd (1996), Heckman, Ichimura, and Todd (1997), and Heckman, Lalonde, and Smith (1999), because in all sectors under analysis, except banking, there are not enough cases to find the appropriate control group. In this sense, the author will try to reduce this problem by complementing the above equations with a regression analysis.

The regression analysis added to equations 2 and 3 incorporates regressors, which control for observable characteristics at the firm level, into the model. It also includes sectoral and macroeconomic variables. The latter variables tried to capture different shocks, thereby isolating the impact of privatization.

The regression analysis primarily consisted of an attempt to model each of the performance measures (P) as a function of the following variables:

$$Y_{i,t} = f(X_{i,t}, T_{i,}, P_{i,t}, P_{I,r}, S_j, R_j, Z_{,t}) \tag{4}$$

where $Y_{i,t}$ are the different performance measures previously detailed for firm *i* in period of time *t*; X_{it} are firm characteristics; T_i are the characteristics of the privatization process of the specific firm; $P_{i,t}$ is the date in which the firm was privatized or given in concession; $P_{i,r}$ is a

dummy indicating whether the firm is privatized or not; S_j are variables at the sector level of the firm; R_j are characteristics of the regulatory agency (for details see Guash and Spiller (1999), and finally Z_t are other controls such as macroeconomic variables.

Additionally, the author explored interaction effects of the privatization dummy, and carried out panel estimations using differences to drop out all firm observed and unobserved time invariant fix effects. Therefore, the three econometric specifications regressed are:

$$P_{i,t} = \alpha_0 + \beta_0 P_{i,t} + \beta_1 t + \beta_2 X_{i,t} + \beta_3 S_j + \beta_4 T_i + \beta_5 R_j + \beta_6 Z_t + \mu_{i,t} \quad (5)$$

$$P_{i,t} = \alpha_0 + \beta_0 P_{i,t} + \gamma_0 P_{i,r} + \beta_1 t + \beta_2 X_{i,t} + \beta_3 S_j + \beta_4 T_i + \beta_5 R_j + \beta_6 Z_t + \mu_{i,t} \quad (6)$$

$$P_{i,t} = \alpha_0 + \beta_0 P_{i,t} + \gamma_0 P_{i,r} + \beta_1 t + \gamma_1 t P_{i,t} + \gamma_2 P_{i,r} t + \beta_2 X_{i,t} + \beta_3 S_j + \beta_4 T_i + \beta_5 R_j + \beta_6 Z_t + \mu_{i,t} \quad (7)$$

Equation (5) is the same as equation (2) but includes firm, sector and macroeconomic variables and, when available, some variables for the characteristics of the regulatory agency. Equation (6) includes a privatization dummy and a control group in the sample to be able to carry out a difference in difference estimation as in equation (3), but again with the controls previously specified. Finally, equation (7) includes additional interactions of the year-privatized dummy ($P_{i,t}$) and the dummy of whether the firm is privatized or not ($P_{i,r}$) includes a time trend to capture trend and convergence over time of newly-privatized firms with firms in the control group (public firms or already private firms).

Equations 5, 6, and 7 were estimated using a simple OLS panel data of firms as detailed in the data section. In addition, it was necessary to account for unmeasured industry and industry/year effects. Making establishment fixed effects allowed the author to drop out all firm observed and unobserved time invariant fixed effects. However, since these performance models could suffer too from endogeneity problems,[12] simultaneous determination and reverse causality of the explanatory variables, following what is now standard procedure in the literature of instrumental variables, were used. The latter problems arise mainly because the privatization process directly affects most of the explanatory variables for many of the performance indicators and therefore, reverse causality or simultaneous determination is a latent problem. Additionally, the GMM-IV estimation allowed for heteroskedasticity of unknown form. In order to have appropriate instruments, the lags of the instrumentalized variables as well as the privatization variables were used. Also, to check if the equation is overidentified by an abundance of instruments, a test of

[12] Heterogeneity may also be present but can be controlled by pooling the data.

overidentifying restrictions—Hansen's "J" statistic (1982)—is provided to evaluate the validity of the model. If this statistic[13] rejects the null hypothesis, the validity of the model is called into question.[14]

Although this estimator is restricted to models linear in the parameters, it is relatively more efficient than an OLS with instrumental variables, even with correction for heteroskedasticity with the White procedure. The efficiency gain is derived from GMM-IV's use of an optimal weighting matrix[15] (rather than the identity weighting matrix implicit in any least squares estimator) to define the appropriate combination of moment conditions. In this context, the moment conditions are the orthogonality conditions of each instrument with the error process. A discussion of the development of the estimator is given in Greene (2000).

4. The Data

The construction of the database required several sources of statistical information. For the pre-privatization period, the primary sources of information were the "White Books"[16] and the published histories of the respective firms. This information was complemented by sources like the fiscal statistical summary of the Central Reserve Bank of Peru, the National Institute of Statistics and Computing Statistics, annual economic surveys, and others (for further details on data sources, see Appendix 1).

For the post-privatization period, the author collected information from various sources. Again, company histories were an excellent source of information. Data on the characteristics of the firms was complemented by statistics from the Supervising Committee of Companies and Securities (CONASEV), annual economic surveys, and monthly financial reports of the Bank and Insurance Superintendent (SBS). Also, the author collected data for sectoral indicators from statistics published by the regulatory agencies (see Appendix 1). It is important to mention that the data collected includes information for the period 1986—2000 in order to provide enough pre-privatization sectoral data. The pre-privatization data allowed

[13] This statistic is distributed Chi-squared in the number of overidentifying restrictions.
[14] The null hypothesis is that the additional moment conditions are approximately satisfied.
[15] Hansen (1982) showed that the optimal weighting matrix for this class of estimators is W = AsyVar[1/N Z'e], where Z is the N x L matrix of instruments and e is the N x 1 matrix of the GMM residuals. For the procedure followed for N observations the optimal W is given by:

$$W = (1/N^2) \sum_{i=1}^{N} z_i z_i' e_i^2$$

where z_i is the ith row of Z and e_i is the ith element of *e*. and ivgmm saves W in e(W) .

[16] The White Books are a collection of all information available for firms to be privatized.

the author to control for the period of restructuring that many enterprises experienced before they could be privatized.

One major problem was the merger, absorption, or division of many companies or business units during the privatization process. This activity made it difficult to follow companies as a single unit through the privatization process. Two alternative methods were adopted to resolve the issue. In the first method, the author aggregated pre-privatization accounting information provided in the White Books; the second alternative relied on the fact that in most of the privatization agreements, as in the merger of CPT and ENTEL into TdP, the privatized entities were required to keep separate accounting books. Thus, the author could either aggregate a company's important data or follow the respective merged unit over time.

A second problem of data collection was that some privatization strategies required that SOEs be divided and each individual unit offered separately. The registers kept before the privatization processes were based on aggregated data, since all the different business units operated as a single enterprise. However, from the day of the decision to privatize, the registers were kept separately for each unit and then consolidated into one record for the company.

Although the companies were considered single units after the privatization process, in some cases there existed a combination of private businesses and SOEs that were only partially privatized. Mixed ownership in a firm's record complicated the measurement of the impact of privatization. In order to partially control for this problem, the authors generated a variable based on the percentage of the firm still owned by the government to measure the intensity of the privatization process and added a discrete dummy of the period in which the privatization started.

The final problem was that parts of the SOE portfolios had been liquidated. Those companies usually represented inefficient units of SOEs that had not been absorbed by the private system. In these cases, when possible, the unit of the company liquidated was excluded, or it was assumed that the new private owner decided to shut down that unit for efficiency reasons.

Between the years 1992 and 2000, 185 transactions took place. This process included 42 SOEs. However, the sample of companies in this paper is less than the total of privatized SOEs. Several important reasons exist for not including all of the privatized SOEs in this study:

- Some state companies were divided horizontally or vertically in small units and privatized separately. In most cases, it was possible to join all the parts in which the company was divided and assume that it remains a single operating unit. In the case of Telefónica del Perú, information from CPT and ENTEL Perú has been added. This was not possible in other cases due to lack of information about some of the units into which the company was divided.

- Most of the concessions and projects have not been included due to the lack of financial information from the pre-privatization period.

- Several firms have been liquidated or had their operations stopped.

- Some firms have been absorbed, or another firm has acquired some of their business units.[17]

- In some cases, information was unavailable.

Despite these limitations, the sample includes 86 percent of the total value of transactions undertaken and 47 percent of the companies involved in the process, as seen in Table 3. These percentages increase to 91 percent and 63 percent, respectively, when liquidated or extinct companies are not considered. Table 4 presents the set of non-financial SOEs included in the study; non-financial companies not included are listed in Table 5.[18]

Table 3
Privatized SOEs Covered in Study

	Total	Effective 1/
Number of privatized firms	47.19%	62.69%
Transactions	86.08%	91.30%

1/ Not including liquidated or defunct firms.

[17] Among the companies acquired, the most important are: Lar Carbon, Sia and Nisa acquired by Cementos Lima; Petrolube, acquired by Mobil Oil; Enata, acquired by Tabacalera del Sur S.A; Compania Minera Mahr Tunel and Compania Minera Paragsha, acquired by Volcan, and Planta de Cemento Rioja, acquired by Cementos Norte Pacasmayo.

[18] Appendix A.3.1 details all the firms collected for the electric sector.

Table 4
Non-Financial Companies Included in Study

SOE	Private Companies	Data Available Public	Data Available Private
Electrolima	Edelnor Luz del Sur Edegel Ede - Cañete Ede - Chancay	1986-1993	1994-1999
Electroperú	Electroperú Egenor Egesur Cahua	1986-1994	1995-1999
Empresa Eléctrica de Piura	Empresa Eléctrica de Piura		1997-1999
	Electro Andes		1997-1999
Electro Centro	Electro Centro	1986-1998	1999
Electro Noroeste	Electro Noroeste	1986-1998	1999
Electro Norte	Electro Norte	1986-1998	1999
Electro Norte Medio	Electro Norte Medio	1986-1998	1999
Electro Oriente		1986-1999	
Electro Sur		1986-1999	
Electro Sur Este		1986-1999	
Electro Sur Medio	Electro Sur Medio	1986-1996	1997-1999
Etevensa	Etevensa	1994-1995	1996-1999
Seal		1986-1999	
Cemento Sur	Cemento Sur	1986-89, 1994	1996-1998
Cementos Lima	Cementos Lima	1987-1993	1994-2000
Cementos Norte Pacasmayo	Cementos Norte Pacasmayo	1992-1993	1994-2000
Cemento Yura	Yura	1986-1990	1994-1995
Centromín		1986-1990	
Sociedad Minera Cerro Verde	Sociedad Minera Cerro Verde	1993	1994-96, 1999-00
Compañia Minera Condestable	Compañia Minera Condestable	1987-1990	1992-2000
Hierro Perú	Shougan Hierro Perú	1986-1990	1998-1999
Minero Perú		1986-1990	
Empresa Minera Especial Tintaya		1986-1989	
Empresa de la Sal	Empresa de la Sal	1991-1994	1995-2000
Petróleos del Perú	Petróleos del Perú	1986-1991	1992-1998
Petroperú - Refineria la Pampilla	Refineria la Pampilla		1996-1998
Química del Pacífico	Química del Pacífico	1988-1992	1993-2000
Certificaciones del Perú	Certificaciones del Perú	1991-1993	
Reactivos Nacionales	Reactivos Nacionales	1987-89, 1991-92	1993-2000
Industrias Navales	Industrias Navales	1991-1992	1993-1996
Sudamericana de Fibras	Sudamericana de Fibras	1991-1992	1993-1996
Empresa Siderúrgica del Perú	Empresa Siderúrgica del Perú	1986-90, 93-95	1996-1997
Solgas		1986-1990	
Compañía Peruana de Teléfonos Empresa de Telecomunicaciones del Perú	Telefónica	1986-1993	1994-2000
Sedapal		1986-1999	

Table 5
Non-Financial Companies Not Included in Study

Liquidated or Defunct	Divided	Land Sales	Absorbed by Other Firm	Information Unavailable
Minpeco USA	Sociedad Paramonga	Proyecto Especial Chavimochic	Lar Carbón	Petrolera Transoceánica
Aero Perú	Epsep	Tierras del Proyecto Especial Pastogrande	Sia	Refineria Cajamarquilla
Petromar		Tierras del Proyecto Especial Chinecas	Nisa	Pesca Perú
Ecasa		Tierras del Proyecto Especial Majes-Siguas	Planta de Cemento Rioja	Enafer
Flopesca		Tierras del Proyecto Especial Jequetepeque-Zaña	Petrolube	Empresa Minera Yauliyacu
Pesquera Grau		Tierras Eriazas	Enata	Empresa Radio Panamericana
Fertisa		Tierras del Proyecto Especial Chira-Piura	Empresa Minera Mahr Túnel	Empresa Difusora Radio Tele
Epersur			Empresa Minera Paragsha	Pletasa
Plesulsa				Planta Lechera de Iquitos
Metaloroya				
Amfa				
Talleres de Moyopampa				
Empresa Minera Cobriza				
Cedega T				
Enatruperú				
Ertur Arequipa				
Eretru				
Ertsa Puno				
Entur Perú				
Emturin				
Kuelap				
Complejo Pesquero de Samanco				
Ergusa				
Incasa				
Ertur				

A separate database was constructed for the financial sector. It consists of annual data and considers private banks during the period as the control group and the Banco de la Nación as a state-owned enterprise. The privatized banks are detailed in Table 6 (also see Appendix A.3.2.).

Table 6
Privatized Banks Included

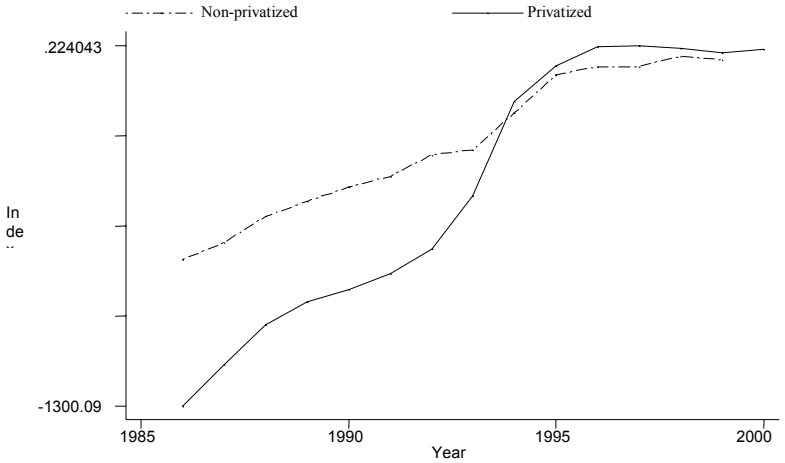
Bank	Date Privatized	Number of Yearly Observations	
		Pre-Privatization	Post-Privatization
Continental	18/04/95	9	6
Interbank	20/07/94	8	7
Comercio	05/06/92	6	9
Pupular	04/11/93	6	-

Appendix 2 gives a detailed explanation of the variables constructed and the manner in which they were calculated. Graph 5 plots all of the performance indicators for the entire database of privatized firms using a non-parametrical approximation (kernel densities) for the distribution of the values of the pre- and post-privatization performance indicators.[19] A clear increase (larger for the privatized firms than the SOEs) of the performance indicators can be seen since 1994, when the process of privatization accelerated. For some indicators, like return to assets, the difference between SOEs and privatized firms is not clear. The latter could occur because privatized firms significantly increased their possession of assets. This, in turn, reduces the impact of an increase in sales. When looking at employment, income, sales and asset efficiency, the positive impact of privatization on the efficiency of firms is even more apparent, despite the fact that the reduction in total number of workers is similar for both SOEs and privatized firms.

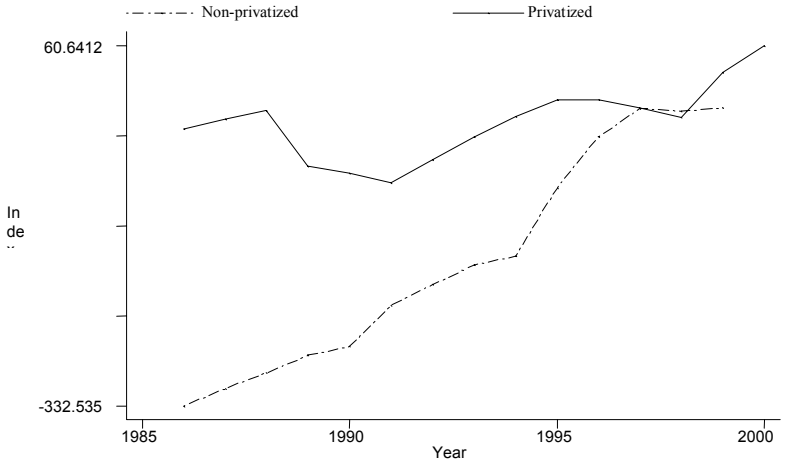
Furthermore, after analyzing the performance indicators for each individual firm, it becomes apparent that the distributions of privatized firms shifted to the right for practically all of the performance indicators. This signifies that the mean value of the specific performance indicator is bigger than when the firms were SOEs. The profitability ratios and the operating efficiency ratios increased after the privatization process. It must be mentioned, however, that the positive tendency in profitability ratios emerged a few years before the actual process began, since many of the privatized enterprises had to undertake a restructuring process instituted through the implementation of reforms in all these sectors.

[19] An unweighted and locally weighted smoothing is carried out.

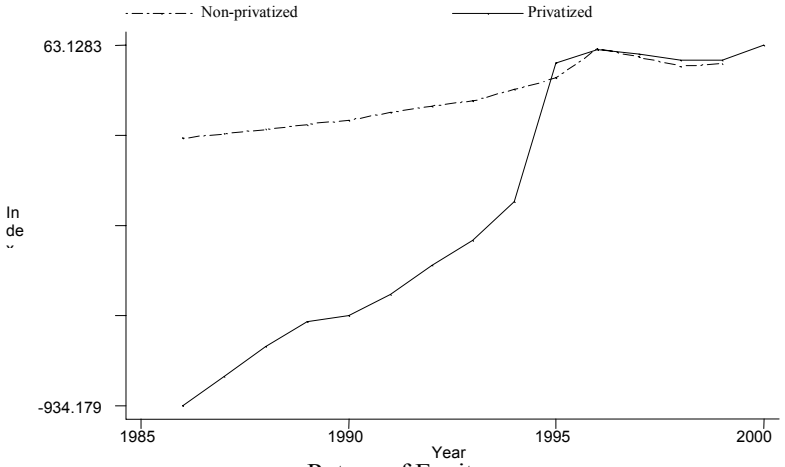
Graph 5 – Evolution of Performance Indicators (Smoothing includes Lowess - KSM) – Industry



Return of Sales

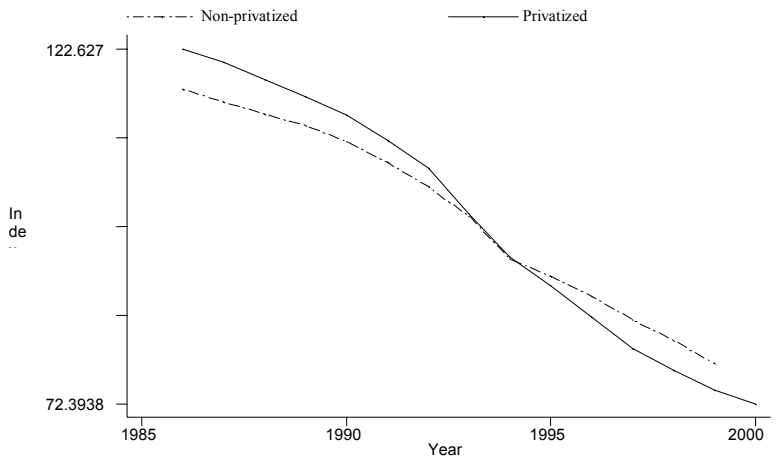


Return of Assets

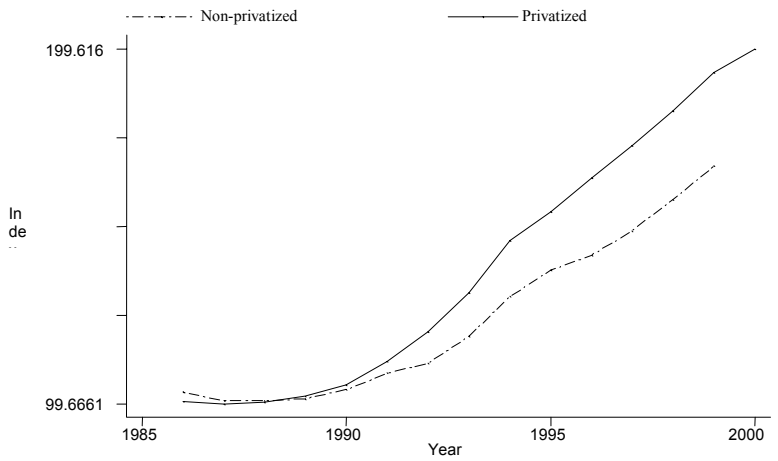


Return of Equity

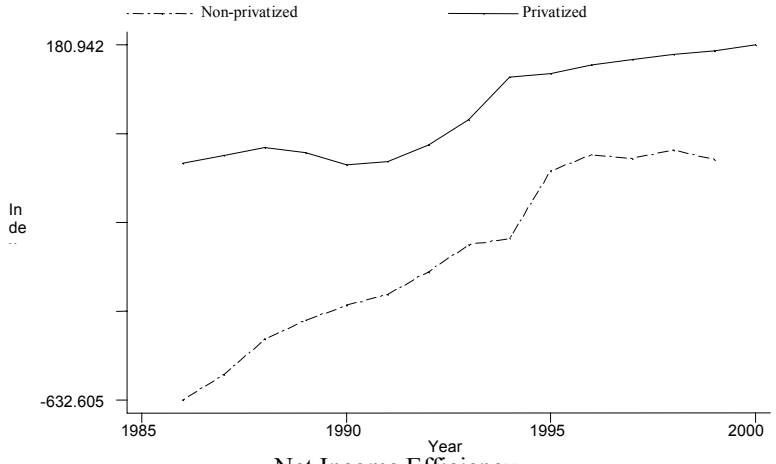
Graph 5 – Evolution of Performance Indicators (Smoothing includes Lowess - KSM) – Industry (continued)



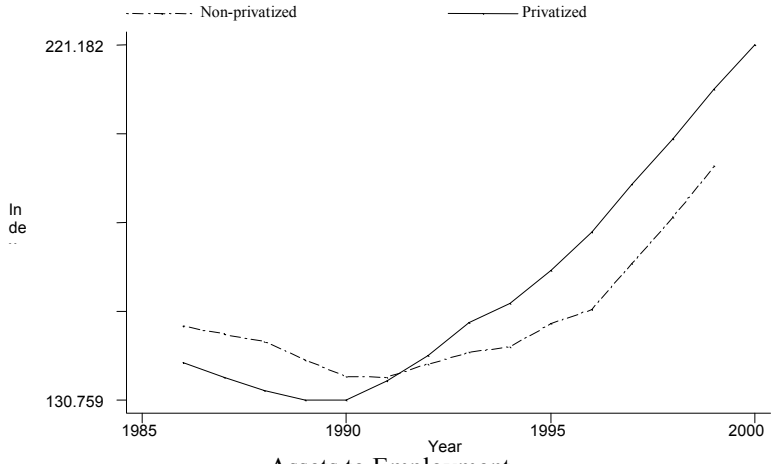
Total Number of Workers



Sales Efficiency

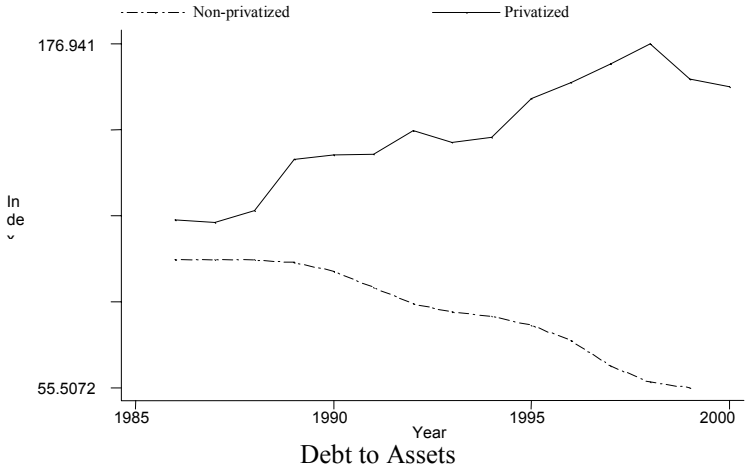


Net Income Efficiency

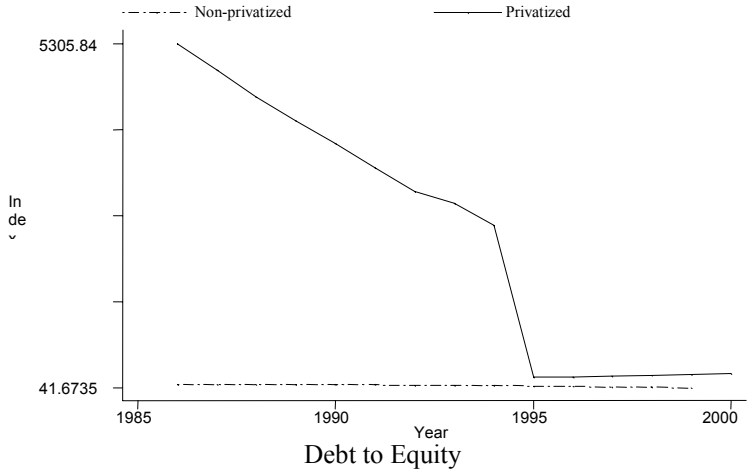


Assets to Employment

Graph 5 – Evolution of Performance Indicators (Smoothing includes Lowess - KSM) – Industry (continued)



Debt to Assets



Debt to Equity

Additionally, it should be noted that the profitability indicators for the banks under examination showed an important decline a few years after the privatization process. This result can be explained by the severe global financial crisis at the end of the 1990s.

On the other hand, improvement in the operating efficiency ratios demonstrated not only a recovery in sales and income of companies across sectors, but also the strong decline in post-privatization total employment across sectors. It is worth mentioning that these indicators had a positive, but weak, evolution in the years before the privatization process, but only after privatization occurred did their pace accelerate.

The capital-deepening indicator (the ratio of assets to employment) showed a very important increase after the privatization process. In all sectors, this indicator was more or less stagnant before the process occurred, but afterwards, it started rising very rapidly. Furthermore, leverage indicators that had a very negative and unstable tendency before privatization began to improve, although not immediately. In all sectors, the negative tendency was reversed in years after the privatization process began, but many faced a relapse due to the global financial crisis. The means and variances for these ratios during the period of analysis, as well as for the values of the most important indicators for all sectors, can be found in Appendix 4.

It is important to mention that even though businesses in the Sanitation Sector (specifically Sedapal) have not been privatized, they are included in this project as a control group for the privatized firms in the services sector. Sedapal is used as a control group because it is a service, like telephones or electricity, and because it had a similar evolution in performance indicators for the pre-privatization period. The latter occurred because the government initially prepared Sedapal for privatization also. This similarity presents an opportunity to include an "untreated group" (a firm that has not been privatized, such as Sedapal) with a similar process of pre-privatization reform comparable to the "treated group" (TdP). In the case of electricity, as detailed in Appendix A.3.1, unprivatized firms still exist. Thus, there are enough controls to evaluate the impact of privatization under the difference in difference methodology.

5. Empirical Results

In this section, the methodologies outlined in section 3 are utilized to analyze the impact of the privatization process on firm performance. First, a detailed analysis of performance indicators is carried out for all privatized firms, then the three major privatized sectors are analyzed: telecommunications, electricity and the financial sector.

Each of the tables consists of two tests comparing pre- and post-privatization. The first test is a first difference analysis using firm and year fixed effects to analyze the difference between pre- and post-privatization information for all firms under study. The second test is a difference in difference test, as detailed in the methodological section. The difference in difference statistic will both test for the change in firm performance compared to the privatization period and take into account relative firm performance when compared to a control group that did not undergo the privatization process. In the all-firm panel, the control groups are all the SOEs present for every year for which information was collected. The GNP per capita for each sector is also included to control for the size of the sector to which the specific firms belong.

When analyzing the two principal sectors where privatization took place, the control firms were those identified as most similar to the ones under analysis. In the case of telecommunications, the control group is Sedapal, the main firm in the Water and Sanitation sector. This firm was not privatized but underwent a pre-privatization reform process similar to that of the telecommunications firm.[20] In the case of electricity, the control group is a group of non-privatized electric companies (Electro Oriente, Electro Sur, Electro Sur Este and Electro Sur Medio). Finally, for the case of the two privatized banks, Banco Continental and Interbank, two different control groups were used. The first group consisted of all private banks in operation between 1986-2000; the comparison was carried out between privatized banks and private banks. The second type of control was state-owned bank Banco de la Nación.

Since there were enough private banks to develop the control group, a propensity score based on Rubin (1974), Heckman et al. (1995), Heckman et al. (1996), Heckman et al. (1997), and Heckman et al. (1999), in which the probability of belonging to the treated group, given observable characteristics (inter-bank funds, assets, total liabilities and equity),[21] was used as a summary of those characteristics in order to measure the average treatment effect on the treated variables in comparison to the performance variables.

Finally, a regression analysis and the estimation of equation 7 were carried out in order to find a possible convergence of performance indicators. The regression analysis also allowed controlling for different variables mentioned in the literature that could explain the

[20] Barber and Lyon (1996) suggest that sample firms must be matched to control firms with similar pre-event performance, which is especially difficult in studies of privatized firms, but Sedapal went through the same reform as the privatized firms.

impact of the privatization of the SOE's. In addition to characteristics of the firm such as size, sector GDP and assets over employment, controls that helped measure the size of market failure were included.

As noted above, and as mentioned by Megginson and Netter (2001), welfare theory argues that privatization tends to have the greatest positive impact in cases where the role of the government in minimizing market failure is the weakest, i.e., for SOEs in competitive markets or markets that can readily become competitive. On the other hand, Shleifer (1998) and others have argued that both in natural monopolies, where competitive considerations are weaker, and markets for public goods, government-owned firms are rarely the appropriate solution. Consistent with this literature, the regression analysis includes a set of variables that will control for the degree of competition approximated by concentration indices as well as variables that will measure the type of regulatory processes that accompanied the privatization process.

5.1. Results for All Privatized Firms

Table 7 presents the results for all of the privatized firms. In the table, first and second differences in performance changes are presented using both the mean and the median. The second differences are presented using as a control group all the firms not privatized in the respective periods of analysis. In all performance indicators and as mentioned in the methodological section, a simple regression was carried out (Equation 2) in which fix effects were included at the level of the firm (Graph 5 plots each of the indicators). Additionally, a test for normality was carried out as well as the Kolgomorov Smironov non-parametric test to determine if the difference in the distribution of the performance indicators was significant. In all the performance indicators, with the exception of leverage and assets to employee, the test showed significant differences.

Even accounting for the wide range of firms included in the study, the performance indicators show a significant improvement after privatization. Specifically, when analyzing three basic indicators, sales, cost per unit and labor, the results obtained are as expected: privatized firms significantly increase their sales compared to non-privatized firms. At the same time, there is a statistically significant reduction in cost per unit. With respect to

[21] For this purpose a probit model was used to estimate the propensity score. For further reference see Rosenbaum and Rubin (1983); Heckman et al. (1996); Heckman, Ichimura, Smith, and Todd (1998); Heckman et al. (1997); Heckman, Ichimura and Todd (1998); and Heckman and Smith (1995).

employment, the expected result occurs: direct employment falls significantly, in line with the restructuring process that the privatized firms went through.

Moreover, the profitability indicators and all the operating efficiency indicators show significant improvement for both the privatized firms and in comparison with the non-privatized firms. In the case of the rate of net income to assets (Net income/PPE)[22], there is no significant difference between the pre- and post-privatization periods. This result was expected because both the denominator and numerator increase with the privatization given the high levels of investments made by new companies in order to increase efficiency.

[22] PPE refers to property, plant and equipment.

Table 7
Performance Changes in Firms After Privatization

	First Difference			Difference in Difference
	Mean Before Median Before	Mean After Median After	t-stat[2/] t-stat[3/]	t-stat[2/] t-stat[3/]
i. Profitability				
Operating Income / Sales	0,053	0,187	2,70	2,700
	0,083	0,207	5,57	4,850
Net Income / Sales	-0,293	0,028	2,41	2,410
	-0,128	0,074	0,30	0,300
Net Income / PPE	-0,062	0,010	1,41	1,410
	-0,027	0,042	1,56	1,090
ii. Operating Efficiency				
Cost per unit	0,947	0,813	-2,70	-2,700
	0,917	0,793	-2,81	-2,980
Sales/Employee[1/]	110,317	242,909	11,91	11,910
	105,089	249,802	2,12	1,970
Log (Sales/Employees)	5,336	5,770	10,85	10,850
	5,377	5,789	3,35	2,550
Sales/PPE	1,215	1,007	-1,43	-1,430
	1,167	0,936	0,25	-0,260
Log (Sales/PPE)	-0,443	-0,321	1,98	1,980
	-0,377	-0,323	0,14	0,240
iii. Output				
Log(Sales)	6,590	11,636	8,47	8,470
	7,596	11,674	1,25	0,350
iv. Labor				
Employee [1/]	114,621	68,621	-13,93	-13,930
	116,612	67,377	-4,88	-2,740
Log (Employee)	6,145	5,635	-14,65	-14,650
	6,183	5,622	-0,28	-5,740
v. Assets				
Log (PPE)	11,641	11,722	0,73	0,730
	11,594	11,768	1,22	0,490

1/ Index (year 1993 = 100)
2/ Correspond to the test of significance of an OLS regression with fix-effects.
3/ Correspond to the test of significance of a LMS regression with fix-effects.

5.1.1 Results for Services Sector

A detailed analysis of the two major privatized sectors (public services and finance) is carried out for the firms included in the panel, and the different time periods over which they were privatized. As previously mentioned, these two sectors represent more than 75 percent of the total revenue collected by the privatization process.

The results of estimating equation 7 are shown in Tables 8 and 9.[23] In the case of public services (electricity, telephones and water as a control), the results of the privatization

[23] As mentioned before, the GMM instrumental variables were carried out to control for heteroskedasticity of unknown form. As expected, the results were consistent with the literature; privatized firms are more profitable

date dummy are only significant for the debt indicators. On the other hand, the time trend is positive and significant, which means that over time all the performance measures improved. The latter, together with the insignificant dummy that captures the date of privatization, suggests that the performance indicators started to improve prior to the privatization process and that only the debt indicators improved significantly faster after the privatization process.

When examining the dummy that captures a firm's privatization status, through a treatment on the treated type of analysis (similar to the second difference) in the ROS, debt indicators, sales efficiency, and ratio assets to employment, there is a significant improvement with respect to Sedapal, which is used as a control group. This result shows that the privatized firms are improving relative to Sedapal. However, the variable of time trend times the privatized firm dummy is significant and negative, meaning that over time, the privatized firms are converging to the lower performance of Sedapal. The latter result is very important, because it sheds light on how in recent years the financial performance of both the telephone company and the electric utilities declined, which could be a consequence of increased market competition.

On the other hand, the coefficient on the percent of government participation has a negative and significant sign for two of the three profitability indicators (ROS and ROA), although it shows a positive and significant sign in sales efficiency and ratio of assets to employment. These results sharply contradict expectations. In addition, the dummy variable for price cap regulation is significant and positive in the ROE and debt to assets ratio, implying that the type of regulation carried out by the regulatory agency also has an important impact on firm performance. Finally, the concentration index is not significant, possibly because there is competition in the electricity sector, especially in distribution, and a monopoly in the telephone sector.

When examining each of the privatized firms (see Appendix 5 and Tables A.5.1. to A.5.5), the results of the first and second difference statistics for the privatized SOEs are completely consistent with what the author found in Table 8. In the cases of Telefónica del Perú S.A. and Electrolima, both the first and second differences are significant and in the expected direction. In the case of the telephone company, only the difference in means in the leverage indicators in both the first and second difference were not significant.

Similarly for Electrolima, all the performance indicators, including leverage, improved significantly. This also holds when a control group is included and the second

---

and productive than public firms (Boardman and Vining, 1989, Vining and Boardman 1992, and La Porta and López-de-Silanes 1999).

difference is calculated. The profitability ratios moved from being negative in average to positive in magnitudes from 8 percent to 20 percent. Furthermore, sales efficiency increased by 500 percent and net income efficiency by more than 800 percent. The main explanation for such a significant increase in operating efficiency was the reduction of employment by more than half (55.6 percent) after privatization. Another significant reduction occurred in debt ratios, which fell more than 50 percent.

Table 8.
Results of Difference in Difference in Difference of Performance Indicators of Privatized Services
(Generalized Method of Moments Instrumental Variables Estimator (GMM-IV))

Variables	ROS	ROA	ROE	Deb To Assets	Deb To Equity	Sales Efficiency	Net Income Efficiency	Ratio Assets/ Employment
Dummy for Date of Privatization (fpriv)	-0.5355	0.0788	-0.0263	-0.5594	-1.9622	-3.9619	-0.346	4,453.08
	(0.8867)	(0.1070)	(0.1706)	(0.2133)**	(0.6373)**	(324.0414)	(186.8696)	(4209.4528)
Dummy if Firm is Privatized (epriv)	1.3155	0.0114	-0.008	0.4892	1.4444	233.929	40.0353	5,574.28
	(0.4665)**	(0.0242)	(0.0425)	(0.0549)**	(0.2800)**	(47.0005)**	(32.4350)	(1,771.8165)**
Time Trend (t)	0.1517	0.0113	0.0176	0.0097	0.0162	34.3105	11.3793	35.6078
	(0.0292)**	(0.0038)**	(0.0063)**	(0.0046)*	(0.0130)	(4.6841)**	(2.7264)**	(84.3298)
t *fpriv	0.1455	-0.0026	0.0077	0.0502	0.1705	53.5472	13.581	192.7965
	(0.0885)	(0.0074)	(0.0123)	(0.0174)**	(0.0525)**	(28.5794)	(15.1040)	(372.0849)
t* epriv	-0.1305	-0.0067	-0.0093	-0.0345	-0.1115	-26.3847	-6.3136	-443.6183
	(0.0425)**	(0.0032)*	(0.0061)	(0.0071)**	(0.0306)**	(5.0188)**	(3.3763)	(148.8121)**
Concentration Index	-0.004	0.0002	0.0003	0.0000	-0.0017	1.1352	0.1334	-15.8996
	(0.0025)	(0.0003)	(0.0006)	(0.0006)	(0.0025)	(1.0208)	(0.4399)	(14.9523)
% Change of GDP per Capita	0.0484	0.0012	0.0015	0.0013	0.0033	-0.0098	4.6774	-72.6033
	(0.0141)**	(0.0018)	(0.0030)	(0.0022)	(0.0101)	(2.0111)	(1.9953)*	(66.4124)
% Government Participation	1.1136	-0.0448	-0.0635	0.1108	0.1387	513.6258	104.3681	6,369.42
	(0.7313)	(0.0184)*	(0.0310)*	(0.0603)	(0.1850)	(122.7353)**	(78.5154)	(1,345.1637)**
Dummy Regulation by Price Cap	-0.4064	0.0602	0.1393	0.1374	0.3629	-66.4621	-58.5637	-626.2109
	(0.2648)	(0.0352)	(0.0569)*	(0.0622)*	(0.1887)	(77.8893)	(36.9691)	(1017.4182)
Dummy Regulation Based on Costs	0.0522	-0.0177	-0.0137	-0.0415	0.0214	222.233	22.2343	-1,485.57
	(0.3372)	(0.0303)	(0.0530)	(0.0469)	(0.2030)	(56.4033)**	(39.7200)	(1524.1113)
log(Employment)	0.2742	0.0247	0.0463	0.0138	0.0598	104.4154	40.8697	-572.6417
	(0.1328)*	(0.0094)**	(0.0176)**	(0.0182)	(0.0818)	(19.5389)**	(13.6881)**	(714.1734)
Ratio Assets/Employment	-0.0002	0.0000	0.0000					
	(0.0001)	(0.0000)**	(0.0000)**					
Constant	-4.4631	-0.2313	-0.4215	-0.0884	-0.4686	-1,450.22	-505.2756	-1,151.88
	(1.5426)**	(0.0860)**	(0.1583)**	(0.1853)	(0.6785)	(256.1044)**	(175.4672)**	(6526.9513)
Observations	93	93	93	96	96	98	98	93
Pseudo- R-squared	0.349	0.335	0.335	0.569	0.502	0.741	0.371	0.426

Note: Standard errors in parenthesis and * significant at 5 percent; ** significant at 1 percent.
Variables log (employment) and loans per worker where instrumented using one period lags and fpriv, epriv) using GMM-IV.
Pseudo R-squared is the R-square using IV regression with robust standard errors.
Hansen J-statistic (1982) was used to test for overidentifying restrictions and in any case of the null hypothesis that the additional moment conditions are approximately satisfied was rejected validating the use of our instruments.

Although the reduction in employment affected labor productivity, the significant improvement of all other performance indicators showed both an increase in labor productivity and a total factor productivity increase of Electrolima after the privatization process.

Similarly to Electrolima, Table A.5.3 shows the results for Electroperú, which was privatized between 1995 and 1996, two years after Electrolima. The results in this case are not as important as in the case of Electrolima. Additionally, only two indicators improved: operating efficiency, as observed in the first difference, and debt to assets, as observed in the difference in difference when the performance of this firm is compared to other firms not yet privatized. The latter can be explained by the fact that the State assumed Electrolima's long-term debts just before privatization. These unsatisfactory results could be a consequence of the incomplete privatization process in this sector. One of the major generating enterprises, "Central Hidroeléctrica del Mantaro," and all of the distribution enterprises in the south are not yet privatized.

5.1.2 Results for the Financial Sector

The results for simple differences in mean for the financial sector were similar to those of the public services sector. There was no significant impact on profitability measures and leverage indicators, but there was a significant increase in the operating efficiency and coverage of the privatized banks (Interbank and Banco Continental). The increase in operating efficiency is mainly explained by the 50 percent reduction in employment, which practically duplicates the indicators. On the other hand, the difference in difference indicators are similar to the first difference indicators when public banks are used as a comparison. When the comparison is done with private banks of similar size, the latter still demonstrate better performance measures than privatized banks. Finally, when the control group was defined with propensity scores, and the difference in difference estimation for privatized banks against matched private banks was carried out, the previous results held.

Furthermore, when analyzing indicators specific to banks, such as personnel expenses per employee, bad loan portfolios, administrative expenses, and financial margin per branch, an increase in the performance of the first two was discovered. These results even hold for personal expenses per employee in the difference in difference indicators despite the fact that the comparison group is pre-existing private banks (see Table 9).

As in the case of public services, the results of estimating equation 7 can be observed in Table 10. The table shows that, unlike the results of the service sector, the date of

privatization (fpriv) is significant for all the performance indicators. This reveals that there was an important change after the privatization process. On the other hand, there is no direct difference between the privatized (epriv=1) and the already private banks (the control group). These results are consistent with the fact that privatized firms are being compared to banks that were always private; therefore, their performance will be better or similar to the private banks.

When analyzing the interaction between the time trend and the dummy for privatized banks (epriv), there is a significant and positive effect for the return over sales. The latter signifies that over time there is an improvement of newly privatized banks compared to already private banks. This result reflects a possible convergence of performance. As expected, there is also a negative time trend that could be justified with the international financial crisis that affected all the banks in the region. Additionally, the interaction between the time trend and the year of privatization dummy (fpriv) is significant and negative, implying that the growth rate of performance since privatization is declining. However, the size of the coefficient is less than a tenth of the coefficient of the date of privatization dummy implying that the overall effect of privatization over performance was positive. The latter decline can also be explained by the international effects of the Japanese and Russian financial crises.

Table 9.

Performance Changes After Privatization - Financial Sector
(Difference between Means and Difference in Difference Tests)

Sector	Means [1]		First Differences		Diff. in Dif. [4]			
	Pre-Privatization	Post-Privatization	T-test [2]	Hotelling [3]	Hotelling [3]	S-Francia [5] Prob>z	Kolmorogrov-Smirnov [6]	
Performance Measure (P_i)								
1. Profitability:								
Return on Sales (ROS)	0,0545	0,0784	-1,320 *	1,743	2,971	0,116	0,476	
	(0,010)	(0,016)						
Return on Assets (ROA)	0,0112	0,0099	0,383	0,147	0,167	0,314	0,994	
	(0,002)	(0,002)						
Return on Equity (ROE)	0,1467	0,1193	0,629	0,395	0,429	0,291	0,994	
	(0,029)	(0,027)						
2. Operating Efficiency:								
Sales Efficiency (SALEFF) - 1994 S/. Thousands	188,85	404,10	-7,122 ***	50,725 ***	35,071 ***	0,125	0,007	***
	(17,921)	(24,582)						
Net Income Efficiency (NIEFF)- 1994 S/. Thousands	10,70	22,60	-2,641 **	6,973 **	12,031 **	0,178	0,082	**
	(2,403)	(4,249)						
3. Employment:								
Total Employment (EMPL)	3132,5	1831,2	7,101 ***	50,419 ***	44,613 ***	0,146	0,001	***
	(95,085)	(177,859)						
4. Leverage:								
Debt to Assets (LEV)	0,9125	0,9175	-0,555	0,308	0,758	0,077	0,329	
	(0,007)	(0,002)						
Debt to Equity (LEV2)	12,134	11,189	0,485	0,235	0,733	0,029	0,476	
	(1,432)	(0,304)						
5. Coverage:								
Loans per worker (LOAW)	354,17	1440,36	-13,329 ***	177,654 ***	120,006 ***	0,015	0,001	***
	(40,902)	(81,520)						
Deposit per worker (DEPW)	513,23	1742,60	-9,216 ***	84,940 ***	93,298 ***	0,051	0,001	***
	(52,243)	(154,157)						
6. Indicators specific to banks								
Personnel Expenses per Employee	-31,45	-53,48	6,74 ***	45,41 ***	22,79 ***	0,665	0,007	***
	(1,98)	(2,54)						
Bad Loan Portfolio	0,08	0,08	-0,26	0,07	0,60	0,671	0,721	
	(0,07)	(0,01)						
Administrative Expenses	0,49	0,42	1,19	1,43	3,91 *	0,010	0,216	
	(0,04)	(0,01)						
Financial Margin per Branch	1913,80	2374,20	-1,27	1,62	1,30	0,724	0,476	
	(253,46)	(145,10)						

Level of Significance: * 10%, ** 5%, *** 1%
Std. Err. in Parenthesis
1/ The year of privatization is 1995
2/ t-test for Ho about difference between means. Unequal N's

$$t = \frac{(\overline{X}_1 - \overline{X}_2)}{S_{\overline{X}_1 - \overline{X}_2}} = \frac{(\overline{X}_1 - \overline{X}_2)}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{(n_1 + n_2 - 2)}} * \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

3/ Test of equality:

$$T^2 = (\bar{x}_1 - \bar{x}_2)S^{-1}(\bar{x}_1 - \bar{x}_2)$$

Where x be a 1xk matrix of the means and S be the estimated covariance matrix.
4/Control group based on propensity score matching.
5/ Shapiro-Francia test for normality. Ho: variable is normally distributed.

Table 10.
Results of Difference in Difference in Difference of Performance Indicators of Privatized Banks
(Generalized Method of Moments Instrumental Variables Estimator (GMM-IV))

Variables	ROS	ROA	ROE	Debt To Assets	Debt To Equity	Sales Efficiency	Net Income Efficiency	Ratio Assets/ Employment
Date of Privatization Dummy (fpriv)	0.3092	0.0538	0.4506	-0.0922	-11.4328	-1.4313	111.1536	-
	(0.1237)*	(0.0182)**	(0.2096)*	(0.0323)**	(4.1852)**	(112.1632	(36.1325)**	(627.2483
Dummy if Firm is Privatized (epriv)	-0.1219	-0.0114	0.0778	0.0334	7.1600	-96.5512	-40.8681	-27.2020
	(0.0508)*	(0.0080)	(0.0696)	(0.0227)	(4.0179)	(82.2342)	(20.4276)*	(461.7338
Time Trend (t)	-0.0208	-0.0023	-0.0132	-0.0002	-0.0470	6.4866	-2.9459	121.4275
	(0.0085)*	(0.0009)**	(0.0070)	(0.0010)	(0.0648)	(2.8684)*	(1.1379)**	(19.2942)**
t *fpriv	-0.0247	-0.0041	-0.0260	0.0108	1.4272	12.5945	-8.1146	175.8407
	(0.0102)*	(0.0017)*	(0.0185)	(0.0036)**	(0.5373)**	(13.5645)	(3.7083)*	(77.6577)*
t* epriv	0.0116	0.0014	-0.0096	-0.0054	-1.0251	4.9709	4.2447	-51.8588
	(0.0059)*	(0.0011)	(0.0080)	(0.0029)	(0.5275)	(11.7789)	(2.9500)	(68.2979)
Participation in Total Credit Allocations (share)	-0.1551	0.0567	1.1762	0.0521	12.3772	1748.686	274.5105	14982.404
	(0.6042)	(0.0601)	(0.7128)	(0.0696)	(6.2735)*	(202.0476)**	(61.9442)**	(1,549.2723)**
% Change of GDP per Capita	0.0006	-0.0005	-0.0035	0.0019	0.0754	-12.4515	-1.8681	-56.0758
	(0.0017)	(0.0003)	(0.0021)	(0.0006)**	(0.0423)	(1.8376)**	(0.8185)*	(9.3183)**
Dummy for Closed State Owned Banks	-0.0548	-0.0067	-0.0125	0.0127	1.4007	-76.3966	-24.4158	-67.1054
	(0.0301)	(0.0048)	(0.0818)	(0.0106)	(1.0590)	(27.8619)**	(10.8307)*	(157.1675
log(Employment)	0.0283	-0.0026	-0.0549	0.0126	0.3098	-	-19.1690	-
	(0.0451)	(0.0045)	(0.0479)	(0.0055)*	(0.3564)	(14.6869)**	(6.4199)**	(97.4552)**
Loans per Worker	0.0001	0.0000	0.0001					
	(0.0001)*	(0.0000)	(0.0000)					
Constant	-0.0258	0.0347	0.4267	0.8055	7.0200	878.7896	154.4391	5849.700
	(0.2340)	(0.0252)	(0.2199)	(0.0325)**	(1.8918)**	(95.6279)**	(46.8079)**	(594.3191)**
Observation	285	285	285	285	285	285	285	285
Pseudo- R-squared	0.111	0.115	0.06	0.162	0.144	0.411	0.146	0.4755

Note: Standard errors in parenthesis and * significant at 5 percent; ** significant at 1%.
Variables log (employment) and loans per worker where instrumented using one period lags and fpriv, epriv) using GMM-IV.
Pseudo R-squared is the R-square using IV regression with robust standard errors.

Hansen J-statistic (1982) was used to test for overidentifying restrictions and in any case of the null hypothesis that the additional moment conditions are approximately satisfied was rejected, validating the use of our instruments.

5.2. Employment

The impact of privatization on the welfare of displaced public workers has received little attention in the literature. One of the main problems faced by researchers is the lack of available data, since information for displaced workers is provided for only one period of time (the moment of displacement from the SOE). In fact, it would require large amounts of time, effort and resources to trace displaced public workers for the purpose of analyzing the long-term impact of privatization on their welfare and earnings. This is possibly the reason why most of the studies analyze the effects of privatization on employment, welfare and wage levels using gross national figures or industry and firm information.

From the previous results, it is clear that there was a significant reduction in direct employment. Moreover, as can be seen in Table 11, average employment fell 35 percent compared to the pre-privatization period. However, when the figures are adjusted, the average decrease in employment is 0.7 percent higher than the privatized firms' industry average.[24] Decomposing the results into white collar and blue collar employees yields the result that unemployment in privatized firms decreased 4.1 percent less than the industry average, but the reduction of employment was 17.6 percent higher than the industry average for blue collar workers. This result demonstrates that the most important reduction of direct employment took place among blue collar workers.

[24] It is important to mention here that Peru had possibly the most restrictive and protective labor legislation in Latin America. After the successive waves of reform in 1991 and 1995, no other country had so liberalized its labor market (Lora and Márquez, 1998, Márquez and Pagés, 1998, and Saavedra and Torero, 1999.) Such drastic reform must be considered when looking at the impact of privatization on employment.

Table 11.
Means of Changes in Employment After Privatization

		Before Privatization (1993)	*After Privatization* (1997)	*Change* (%)
All	*mean*	2461,17	1605,75	-34,8%
	median	2237,50	1393,50	-37,7%
		(1508,536)	(1300,427)	
White-collar	*mean*	2049,17	1387,00	-32,3%
	median	1746,50	1102,00	-36,9%
		(1457,232)	(1153,019)	
Blue-collar	*mean*	412,00	218,75	-46,9%
	median	210,00	149,50	-28,8%
		(495,463)	(247,820)	

1/ Standard Deviation in Parenthesis

Consequently, one of the major criticisms of the privatization process is that a significant reduction in the number of employees could be the major reason for the improvement in performance, rather than a real increase in total factor productivity. To address this issue, the author follows La Porta and López-de-Silanes (1999) to calculate the impact on privatized companies if all the layoffs are included at their original salaries.[25] For this purpose, the cost of layoffs was calculated as: $(L_{pre}-L_{1994})*Wage_{pre}$, where W_{pre} is the average wage in the year preceding privatization, L_{pre} is the average number of employees in the years preceding privatization, and L_{1994} is the level of employment in 1994 after privatization.

The results are shown in Table 12. There is no significant difference between the post-privatization performance indicators and the post-privatization performance indicators under the assumption that there were no layoffs. For utilities, the percentage change in the profit indicators goes from –2 percent to –5 percent, while in the case of the banks the impact is bigger, averaging –12 percent and –26 percent for Banco Continental and Interbanc, respectively. When looking at the percentage change in the net income efficiency, a variable that is directly affected by the number of employees, TdP was impacted –12 percent, Interbanc –34 percent, and Continental –14 percent.

[25] It is important to mention that since privatization, privatized firms' wages have had significant increases in both absolute and relative terms with respect to the industry. On average, salaries increased 180 percent at privatized companies and were 91 percent higher than the specific industry average.

In the case of TdP, contracting service companies created a significant amount of indirect employment. These service companies frequently consisted of personnel laid off as a result of the privatization. This required an additional exercise that involved subtracting the costs from all service payments carried out by the company in order to find the net employment layoff. This resulted in a positive percentage change for some of the profitability indicators since the wage costs prior to privatization were smaller than what the company pays the service companies. Furthermore, the number of employees in the telecommunications sector rose from 13,000 employees in 1993 to 34,000 employees in 1998, according to OSIPTEL.

In general, for all the companies studied, the results of the modified version of La Porta and López-de-Silanes' (1999) exercise can be explained through the following reasons: total wages of laid-off employees represented only 1.4 percent of total sales, since the average wages paid prior to privatization were extremely low; there was a significant increase in post-privatization sales, which spread labor costs over a wider base; and there was also a significant increase in the productivity of other factors, especially capital, because of the increase in coverage and the new investments undertaken by privatized firms.[26]

In the case of utility companies, there was a clear and insignificant increase in sales. In telecommunications, the teledensity[27] of fixed phones grew from 2.9 in 1993 to 7.8 in 1998. Similarly, cellular phones grew from 50,000 to 735,000 in the same two years. In the electricity sector, the coefficient of electrification grew an average of 27 percent and the generation of electricity grew an average of 25 percent as a result of the heavy volume of investments (approximately US$682 million). Even more than in telephones and electricity, there was an important rebalancing of tariffs see Torero and Pascó-Font (2000), which prior to the privatization period were usually 75 percent or less of the costs of producing the service.

In summary, the results show: a clear improvement in firm performance since privatization, according to the Megginson et al. (1994) hypothesis; a relative improvement compared to control groups; and an improvement in both labor productivity, as a consequence of the layoffs, and total factor productivity.

[26] It is important to mention that as in La Porta and López de Silanes, the methodology overstates the contribution of layoffs given the assumption that laid-off workers had zero productivity.
[27] The number of phones per 100 inhabitants.

Table 12.
Impact of Layoffs on Performance Indicators for Major Privatized Firms

	Post-Privatization				Post-Privatization without Layoffs			
	ROS	**ROA**	**ROE**	**Net Income Efficiency**	**ROS**	**ROA**	**ROE**	**Net Income Efficiency**
TdP	0.385	0.162	0.287	81.385	0.366	0.155	0.272	71.883
	(0.09)	(0.05)	(0.08)	(42.84)	(0.09)	(0.05)	(0.07)	(40.57)
Electrolima	0.170	0.056	0.072	136.742	0.165	0.054	0.069	132.152
	(0.08)	(0.03)	(0.03)	(72.01)	(0.08)	(0.03)	(0.03)	(69.05)
Electroperu	0.257	0.030	0.050	258.850	0.252	0.029	0.049	252.863
	(0.22)	(0.02)	(0.04)	(206.78)	(0.22)	(0.02)	(0.04)	(206.65)
Sedapal	0.160	0.027	0.034	33.496	0.154	0.026	0.032	25.160
	(0.04)	(0.01)	(0.01)	(7.70)	(0.04)	(0.01)	(0.01)	(11.61)
Continental	0.091	0.011	0.130	23.434	0.080	0.010	0.115	20.051
	(0.05)	(0.01)	(0.09)	(13.67)	(0.06)	(0.01)	(0.09)	(13.70)
Interbank	0.066	0.010	0.116	17.323	0.048	0.007	0.087	11.457
	(0.06)	(0.01)	(0.10)	(14.27)	(0.06)	(0.01)	(0.11)	(16.37)

Note: Layoffs are included with the average wage of 1994 and their marginal productivity is assumed to be zero.
All numbers are averages for the post'privatization period (1994-2000).

6. Conclusions

Privatization began in Peru in 1991 in order to generate vital fiscal revenues for the government and improve the quality and coverage of infrastructure and other services. Privatization took place in the telecommunications, electricity, mining, financial services and hydrocarbons sectors. The process was accompanied by sector reforms aimed at establishing competitive markets and autonomous regulatory agencies. The result was one of Latin America's greatest privatization success stories. Nevertheless, it is important to note that a strong record of economic policy and performance underpinned the success of the privatization process. Macroeconomic stability, an open policy-making environment and competitive sector markets gave the firms a stable and certain environment through 1998. Without such conditions, success would not have been achieved.

Unfortunately, the depth of the reforms, especially the extent of privatization, was uneven across sectors. Despite this reform mixture, the results in terms of improvement on the supply side are positive and very significant. The analysis clearly shows a significant improvement in firm performance since privatization.

It is clear from the analysis that privatization had an impact on public utility firms in comparison to non-privatized firms that went through a similar pre-privatization restructuring. Although over time there was a decrease in performance, implying less profits, this could have been the result of an increase in competition in the sector and a slowdown in services such as electricity due to the privatization process.

Comparable results can be found when examining the two major privatized sectors. In both the financial and utilities sectors, a positive first difference effect was found. In the financial sector, the main difference was the comparison with previously-privatized companies. The performance indicators for financial enterprises were better than those of the pre-privatization period, but they were not as good as those of the control group (private banks). The results also show that privatized banks have a convergence tendency toward the best performers in the private sector. The latter is primarily driven by the significant recent improvement of Banco Continental.

It is clear that in the short-run, the impact of privatization on employment is negative since SOEs usually hired people based on political rather than technical criteria. The privatized firms had to adjust to the new market conditions and reduce the level of employment; consequently, only 36 percent (approximately 43,000) of employees kept their jobs after the privatization process. Two effects have been demonstrated: a significant

increase in indirect employment through services and average growth of 28 percent in total employment—both direct and indirect—since privatization. Nevertheless, in order to measure the real impact on employment in the medium-run, it is inadequate to study only employment in a specific sector. One also has to study the effects on other sectors stemming from the higher demand for services by the privatized firms.

Despite the success in terms of firm performance, service quality and consumer benefits must be taken into account to make a balanced judgment of the privatization process. As mentioned in Torero and Pascó-Font (2001), there exist important problems in the privatization process that could explain why positive welfare impacts on consumers were not very significant, or were even negative in electricity. Although the electricity sector has shown important improvements, the positive effects of privatization have not yet reached important regions of urban Peru. This could explain why, on average, consumers are not experiencing an increase in welfare. In contrast, telephony is the sector that has experienced the most significant improvements since privatization. Both in terms of supply and demand, the results show a positive balance, including an increase in progressiveness, for the telecommunications sector. However, a significant reduction in household consumer surplus has occurred since 1997.

In summary, improved firm performance clearly suggests the necessity of continuing the privatization process, especially in electricity, water, and other SOEs where major reforms need to be concluded, or in some cases begun. This is only a supply-side analysis, but when combined with results from the demand-side analysis (see Torero, Schroth, and Pascó-Font (2000)), it is apparent that firms and regulatory agencies must develop adequate policies to facilitate the transfer of performance benefits from privatized firms to consumers. In so doing, even further increases in the gains in welfare derived from the process will be possible. Policymakers must fortify the regulatory agencies and increase their independence. They also must work with privatized firms to identify vulnerable groups and to develop tailored measures, such as appropriate consumption plans, that will help increase consumer welfare.

References

Abdala, M. 1992. "Distributional Impact Evaluation of Divestiture in a High-Inflation Economy: The Case of Entel Argentina." Boston, United States: Boston University. Doctoral dissertation.

Adam, C., W. Cavendish, and P. Mistry, 1992. *Adjusting Privatization: Case Studies From Developing Countrie*s. London, United Kingdom and Portsmouth, United States: J. Curry and Heinemann.

Aharoni, Y. 1990. "On the Measurement of Successful Privatization." In: R. Ramamurti and R. Vernon, editors. *Privatization and Control of State-Owned Enterprise*s. Washington, DC, United States: World Bank.

Arellano, M., and Bond, S. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*: 58, 277-297.

Arellano, M., and Bond, S. 1998. "Dynamic Panel Data Estimation Using DPD98 For GAUSS." Mimeographed document.

Barber, B. and Lyon, J. 1996. "Detecting Abnormal Operating Performance: The Empirical Power and Specification of Test Statistics." *Journal of Financial Economics* 41: 539-99.

Birch, M. and Haar, J., editors. 2000. *The Impact of Privatization in the Americas*. Miami, United States: North South Center Press.

Boardman, A. and Vining, A. 1989. "Ownership and Performance in Competitive Environments: A Comparison of the Performance of Private, Mixed, and State-Owned Enterprises." *Journal of Law and Economic*s 32: 1-33.

Borcherding, T., Pommerehene, W. and Schneider, F. 1982. "Comparing the Efficiency of Private and Public Production: The Evidence from Five Countries". *Zeitschrift für Nationalokonomi*e 2: 127-56.

Bortolotti, B., Fantini, M. and Siniscalco, D. 2000. "Privatizations and Institutions: A Cross-Country Analysis." Forthcoming in *Journal of Financ*e.

Bourbakri, N. and Cosset, J. 1998. "The Financial and Operating Performance of Newly Privatized Firms: Evidence from Developing Countries." *Journal of Finance* 53: 1081-1110.

Boycko, M., A. Shleifer, and R. Vishny, 1993. *A Theory of Privatizatio*n. Cambridge, United States: MIT Press.

Caillaud, B., R. Guesnerie, P. Rey, and J. Tirole. 1988. "Government Intervention in Production and Incentives Theory: A Review of Recent Contributions." *RAND Journal of Economic*s 19: 1-26.

Caves, R. 1990. "Lessons from Privatization in Britain: State Enterprise Behavior, Public Choice, and Corporate Governance." *Journal of Economic Behavior and Organization* 13(2): 145-169.

Chong, A. and Calderon, C. 2000. "Causality and Feedback Between Institutional Measures and Economic Growth." *Economics and Politic*s 12(1): 69-82.

Crandall, R. 1989. *Efficiency Gains from Divestitur*e. Washington, DC, United States: Brookings Institution.

Crépon, B., E. Duguet, and J. Mairesse. 1998. "Research, Innovation, and Productivity: An Econometric Analysis at the Firm Level." NBER Working Paper No. 6696. Cambridge, United States: National Bureau of Economic Research.

Donahue, J. 1989. *The Privatization Decision*. New York, United States: Basic Books.

D'Souza, J. and Megginson, W. 1999. "The Financial and Operating Performance of Privatized Firms During the 1990s." Athens, United States: University of Georgia.

Eckel, C., Eckel, D. and Singhal, V. 1997. "Privatization and Efficiency: Industry Effects of the Sale of British Airways." *Journal of Financial Economic*s 43: 275-298.

Galal, A., Jones, L., Tandon, P. and Vogelsang, I. 1994. *Welfare Consequences of Selling Public Enterprises*. Washington, DC, United States: Oxford University Press/World Bank.

Greene, W., *Econometric Analysis.* 4th Ed. 2000. New York: Prentice-Hall.

Guasch, J.L. and Spiller, P. 1999. *Managing the Regulatory Process: Design, Concepts, Issues, and the Latin America and Caribbean Story.* Washington, DC, United States: World Bank.

Hachette, D. and Luders, R. 1992. *La Privatización en Chil*e. Oakland, United States: Institute for Contemporary Studies Press/Centro Internacional para el Desarrollo Económico.

Hansen, L. 1982. “Large Sample Properties of Generalized Methods of Moments Estimators.” *Econometrica* 50: 1029-1054.

Heckman, J., R. LaLonde, and J. Smith. 1999. “The Economics and Econometrics of Active Labor Market Programs.” In O. Ashenfelter and D. Card, editors. *Handbook of Labor Economics, Vol. III*. Elsevier, Amsterdam: North-Holland Press.

Heckman, J., and Hotz, J. 1989. "Choosing Among Alternative Nonexperimental Methods for Estimating the Impact of Social Programs: The Case of Manpower Training". *Journal of the American Statistical Association* 84: 862-880.

Heckman, J., and Smith, J. 1995. "Assessing the Case of Social Experiments". *Journal of Economic Perspectives* 9: 85-110.

Heckman, J., H. Ichimura, and P. Todd. 1997. “Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Program.” *Review of Economic Studies* 64: 605-654.

Heckman, J., Ichimira, H., Smith, J. and Todd, P. 1996. “Characterizing Selection Bias Using Experimental Data.” *Econometrica* 66: 1017-1098.

Kikeri, S., Nellis, J. and Shirley, M. 1994. “Privatization: The Lessons From Market Economies.” *World Bank Research Observe*r 9: 241-272.

La Porta, R. and López-de-Silanes, F. 1999. "Benefits of Privatization: Evidence from Mexico". *Quarterly Journal of Economics* 114(4): 1193-1242.

Laffont, J.J. and Tirole, J. 1993. *A Theory of Incentives in Procurement and Regulation*. Cambridge, United States: MIT Press.

López-de-Silanes, F. 1997. “Determinants of Privatization Prices.” *Quarterly Journal of Economic*s 112: 966-1028.

López-de-Silanes, F. and Zamarripa, G. 1995. “Deregulation and Privatization of Commercial Banking: Pre- versus Post-Performance.” *Review of Economic Analysis/Revista de Análisis Económico*. 10 (2): 113-164.

Lora, E., and Márquez, G. 1998. “El problema del empleo en América Latina: Percepciones y hechos estilizados.” Document prepared for the meeting of IDB Governors, Cartagena, Colombia.

Luders, R. 1991. “Chile’s Massive SOEs Divestiture Program, 1975-1990: Failures and Successes.” *Contemporary Policy Issue*s 9 (4): 1-19.

Mackenzie, G. 1998. “The Macroeconomic Impact of Privatization.” *IMF Staff Paper*s 45 (2): 363-373.

Márquez, G. and Pagés, C. 1998. *Ties That Bind: Employment Protection and Labor Market Outcomes in Latin America*. Document prepared for the meeting of IDB Governors, Cartagena, Colombia.

Megginson, W. and Netter, J. 2001. "From State to Market: A Survey of Empirical Studies on Privatization." *Journal of Economic Literature* 39: 321-389.

Megginson, W., Nash, R. and van Randerborgh, M. 1994. “The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis.” *Journal of Financ*e 49(2): 403-452.

Ramamurti, R., editor. 1996. *Privatizing Monopolies: Lessons From the Telecommunications and Transport Sectors in Latin America.* Baltimore, Untied States: The Johns Hopkins University Press.

Ramamurti, R. and Vernon, R. 1991. *Privatization and Control of State Owned Enterprises*. Washington, DC, United States: World Bank.

Rubin, D. 1974. “Estimating Causal Effects to Treatments in Randomized and Nonrandomised Studies.” *Journal of Educational Psychology* 66: 688-701.

Rubin, D. 1977. “Assignment to Treatment Group on the Basis of a Covariate.” *Journal of Educational Studies* 2:1-26.

Rubin, D. 1979. “Using Multivariate Matched Sampling and Regression Adjustment to Control Bias in Observational Studies.” *Journal of the American Statistical Association* 74: 318-328.

Sáenz, R. 1992. “An Overview of Privatization in Chile: The Episodes, the Results, and the Lessons.” Santiago, Chile: CIEPLAN. Mimeographed document.

Saavedra, J. and Maruyama, E. 2000. “Rigidez o flexibilidad del mercado laboral peruano: Un análisis económico de la legislación laboral.” Working paper No. 28. Lima, Peru: GRADE.

Saavedra, J., and Torero, M. 1999. “Labor Market Reforms and Their Impact on Formal Labor Demand and Job Market Turnover: The Case of Peru.” Working Paper R-394. Washington, DC, United States: Inter-American Development Bank, Research Department.

Shapiro, C. and Willig, R. 1990. "Economic Rationales for the Scope of Privatization." In: E. Suleiman and J. Waterbury, editors. *The Political Economy of Public Sector Reform and Privatizatio*n. London, United Kingdom: Westview Press.

Shleifer, Andrei; 1998. "State versus Private Ownership." NBER Working Paper No. 6665. Cambridge, United States: National Bureau of Economic Research.

Shleifer, A. and Vishny, R. 1994. "Politicians and Firms." *Quarterly Journal of Economic*s. 46: 995-1025.

Shukla, J. and Guasch, J.L. 1999. "Peru: Private Participation in Infrastructure. Overview of Achievements, Priorities and Opportunities." Washington, DC, United States. Mimeographed document.

Sinn, H.W., 1992. "Privatization in East Germany." NBER Working Paper No. 3998. Cambridge, United States: National Bureau of Economic Research.

Torero, M., E. Schroth, and A. Pascó-Font. 2000. "The Impact of the Privatization of Telecommunications in Peru on the Welfare of Urban Consumers." Lima, Peru: Mimeographed document.

Torero, M. and Pascó-Font, A. 2001. *The Social Impact of Privatization and Regulation of Utilities in Urban Peru.* Helsinki, Finland: Wider.

Vickers, J. and Yarrow, G. 1988. *Privatization: An Economic Analysi*s. Cambridge, United States: MIT Press.

Vining, A. and Boardman, A. 1992. "Ownership versus Competition: Efficiency in Public Enterprises." *Public Choice* 73: 205-39.

World Bank. 1995. *Bureaucrats in Business: The Economics and Politics of Government Ownership*. Washington, DC, United States: Oxford University Press/World Bank.

Yan, B., Chen, X. and Roberts, M. 1997. "Firm Level Evidence on Productivity Differentials, Turnover, and Exports in Taiwanese Manufacturing." NBER Working Paper No. 6235. Cambridge, United States: National Bureau of Economic Research.

Yan, B. Chung, S. and Roberts, M. 1998. "Productivity and The Decision to Export: Micro Evidence from Taiwan and South

Korea." NBER Working Paper No. 6558. Cambridge, United States: National Bureau of Economic Research.

- **Data Sources**

Banco Central de Reserva del Perú (BCRP). 1986-2000. *Annual Report*.

----. Web Page: http://bcrp.gob.pe.

Cementos Lima S.A. 1988 – 1998. *Annual Report*. Lima, Perú: Cementos Lima, S.A.

Comisión de Promoción de la Inversión Privada (COPRI). 1996. *White Book.* Cementos Lima S.A. Perú.

----. White Book; CEPREL – Electrolima S.A. Perú

----. White Book; Electroperú, S.A. Perú

----. White Book; Electro Sur Medio, S.A. Perú

----. White Book; Empresas Regionales de Electricidad: Electro Norte, S.A., Electro Norte Medio, S.A., Electro Noroeste, S.A. and Electro Centro, S.A. Perú

----. Web page: http://www.copri.org.

Comisión de Tarifas Eléctricas (CTE). 1984, 1985, 1986 – 1989, 1990 – 1991, 1996, 1999. *Annual Report*. Lima, Perú.

----. 1992-1993, 1994, 1995, 1996, 1997, 1998, 1999. *Statistical Yearbooks*. Lima, Perú.

Comisión Nacional Supervisora de Empresas y Valores (CONASEV); Web Page: http://www.conasevnet.gob.pe.

Compañía Peruana de Teléfonos S.A.. 1985 – 1987, 1990 – 1993. *Annual Report*. Lima, Perú.

Electrolima, S.A. 1985 – 1988, 1990 – 1994, 1997. *Annual Report*. Lima, Perú: Electrolima, S.A.

Electroperú, S.A. 1985 – 1999. *Annual Report*. Lima, Perú: Electroperú, S.A.

Entel Perú, S.A. 1990, 1991, 1993. *Annual Report*. Lima, Perú: Entel Perú, S.A.

----. 1985 – 1992. *Statistical Yearbooks.* Lima, Perú: Entel Perú, S.A.

Sedapal, S.A. 1997. "Historia del abastecimiento del agua potable de Lima 1535 - 1996". Lima, Perú: Sedapal, S.A.

Sedapal, S.A. 1984 –1999. *Annual Report*. Lima, Perú: Sedapal, S.A.

Superintendencia de Banca y Seguros (SBS). 1986 – 2000. *Weekly Notes*. Lima, Perú.

Superintendencia Nacional de Servicios de Saneamiento (SUNASS). 1998. "Indicadores de Gestión 1996–1998". Lima, Perú: SUNASS.

----. 1996 – 1999. *Annual Report*. Lima, Perú: SUNASS.

----. Centro de Documentación, Web Page: http://www.sunass.gob.pe/cendoc.html.

Telefónica del Perú, S.A. 1994 – 2000. *Annual Report*. Lima, Perú: Telefónica del Perú, S.A.

Other Data Sources:

From the Commission of Energy Tariffs:

The Statistical Yearbook (1994–1998).
A yearly publication that details regulation of electricity rates and economic results for the Peruvian electricity market.

CTE Informs (June 1999–November 2000).
Monthly publication with news about regulation, markets, agents and other current topics of interest in the electricity and hydrocarbon sectors in Peru and all around the world.

El Informativo (June 1996–November 2000).
Periodical publication containing technical articles, market information, evolution of rates, company news, statistics and sector news.

Commercial Information (First Quarter, 2000).
Publication containing results from the processing and analysis of commercial information provided by the electric sector companies.

Yearly Report (1994–1999).
Electric Sector Operations (January 2000–November 2000).
Monthly publication containing information on production and demand of electricity, prices and other information related to the operation of the sector.

From OSIPTEL:

The Transformation of Telecommunications in Peru: 1995 Report.

Regulation and the Telecommunications Market: 1996 Report.

The Opening of the Telecommunications Market: 1997 Report.

Consumers and Telecommunications: 1998 Report.

Five years in the telecommunications market: 1999 Report.

Institutional Report, 2000.

Technical Studies (various titles).

Studies in Telecommunications (various titles).

Bulletins (various titles).

Appendix 1

A.1.1. COPRI: White Books

The White Books represent essential information sources for the pre-privatization period. The White Books contain a series of valuation studies of privatized companies, financial information, engineering, employment, installed capacity, market share and projection data, etc. They are the primary source of statistical information for the companies. At the same time, it should be mentioned that there are as many White Books as privatization processes. At the end of each process, the Special Privatization Committee (CEPRI) is charged with publishing the White Book for that particular process.

In the case of companies that were divided to be privatized, the White Books allowed the authors to obtain disaggregated statistical information. Alternatively, in the case of the privatization of joint ventures (ie., Entel and CPT), these books permitted the the compilation of consolidated financial information.

A.1.2. MITINCI: Yearly Economic Surveys

The Yearly Economic Surveys (EEAs) are carried out each year for every manufacturing company in Peru by the Industry, Tourism, Integration and International Commercial Negotiation Ministry (MITINCI). The companies are required by law to answer this survey, which consists of three established forms. Despite this legal requirement, a large percentage of companies do not abide by this obligation even after the MITINCI tries to follow up with them.

The first form is sent to companies with a maximum of 4 workers, the second to companies with 5 to 19 workers, and the last one to companies with 20 or more workers. The surveys differ in size. The survey for small companies has nine chapters, while the survey for large companies has 17 chapters.

This information helps to create a database that identifies all the relevant variables of the survey for the years between 1992-1996, as well as the CIIIU 4 digits at company level.

Specifically, in the case of companies with 20 or more workers, the chapters in the Yearly Economic Surveys include the following information:

- Identification and location of the business or industrial plant.
- Sales price list of products manufactured by the business.
- Working staff during the year.
- Remunerations and other staff expenditures during the year.
- Expenditure on electricity.
- Expenditures on services carried out by a third party, taxes and diverse administration charges paid by the business, and cost of merchandise sold.
- Inventory.
- Yearly general sales tax, selective consumption tax, special tax and others.
- Annual input expenditures.
- Annual expenditures on raw materials and auxiliary materials.
- Annual expenditures on fuels and lubricants.
- Annual production for sale, transfer to or manufacture by a third party.
- Annual Intermediate production.
- Summary of fixed assets movement.
- Summary of accumulated depreciation movement.
- Annual real and potential production by main production lines.
- Annual net sales and other revenues during the year.

A.1.3. SBS: Monthly Financial Information

The main objective of the Bank and Insurance Superintendence (SBS) is to preserve the interest of the depositors, the insured and the members of the Private Pension System. The agency's supervisory duty consists of constantly monitoring the solvency and integrity of each of the companies that act in the market. One of its primary missions is to generate confidence in the public in relation to the solvency of the financial system. Secondarily, it provides adequate and appropriate information for the promotion of prudent behavior by economic agents.

A.1.4. MTPS : Pay Roll Summary Sheet

The pay roll summary sheet is a complex directory containing labor information for businesses with ten or more workers. This is due to the fact that the Labor Ministry requires all such businesses to report their payrolls to the Ministry annually. The authors used this data source to access companies' labor information.

A.1.5. SBS : Monthly Financial Information

The Bank and Insurance Superintendency (SBS) is the agency in charge of the regulation and supervision of the Financial System. This information, generated and spread through many publications, will be very useful for acquiring information at the bank level, which in turn allows for the acquisition of data on financial incomes, capital expenditures, assets, personal expenditures, other expenditures, deposits, offerings, financial expenditures, interbank deposits, overdue portfolios, number of agencies, number of workers and net profit. Additionally, the detailed information provided by the SBS simplifies the tracking of the different mergers and takeovers that occurred in the last ten years. This is possible due to the fact that The Bank and Insurance Superintendence is in charge of consolidating the statistical information of the banks.

A.1.6. CONASEV: Financial Statements of Quoted Companies; Company Ranking, 1997-99

The National Supervising Committee of Companies and Securities (CONASEV) promotes efficiency in the security and product markets through regulation, supervision, and diffusion of information. At the same time, this will strengthen the confidence and transparency between participants. Every quoted company in the Stock Exchange in Lima is forced to give financial and accounting information. On the other hand, CONASEV is in charge of spreading this information through periodical publications, through its documentation center (CENDOC) or in real time through the Internet. This information is useful in this study only for those private companies listed on the stock exchange.

CONASEV also offers the public a general ranking of the top companies in the country for the period 1997-1999 in order to contribute to better knowledge of corporate management in the country. The ranking contains information according to income level, total assets, net fix assets, patrimony and year outcome, as well as classification by economic activity.

A.1.7. OSIPTEL: Reports

The Supervisory Agency for Private Investment in Telecommunications (OSIPTEL) is easily the most important source of data for the telecommunications sector. Since its creation in July 1993, OSIPTEL's main functions have been the promotion of the development of public telecommunication services, protecting consumer rights, and

promotion and guarantee of a free and fair competitive environment. Throughout its six years of institutional life, OSIPTEL has managed to compile and diffuse, through various publications, statistical information relevant to the sector.[28]

These publications grant access to relevant sectoral information since 1993. This information includes coverage statistics, quality of service, rates, earnings structure, efficiency and economic results.

A.1.8. OSINERG: Reports

The Supervisory Agency for Investment in Energy (OSINERG) is in charge of supervising the activities carried out by companies in the sub sectors of electricity and hydrocarbons. It is, therefore, a valuable source of information for the energy sector. Created December 30, 1996, OSINERG was conceived as an assessment and supervision tool to guarantee compliance of rules and contracts with concessionary companies. Among other functions, OSINERG supervises compliance with legal and technical norms, as well as commitments to the Government made through the electric concessions contracts. Furthermore, OSINERG must ensure the protection of consumers' rights in the sub sector of electricity, which includes overseeing the security, quality and continuity of the service, and protecting the environment from the possible damages that these activities might bring about.

A.1.9. CTE: Reports

The Commission of Energy Tariffs is a technical and decentralized division of the Energy Sector. It is responsible for setting rates for electricity, liquid hydrocarbon transportation, natural gas transportation and natural gas distribution. In competitive markets, the companies lack influence—at least to a relevant degree—on market prices; on the contrary, monopolies have enough market power to fix them. As a consequence, and to prevent the user from being adversely affected by the setting of monopoly rates, the CTE is in charge of regulating these prices, with rates that reflect the production costs plus a reasonable profit margin. In this way, the benefits are spread out not only between the suppliers of the service, but also between the users.

[28] A list of some of its more important publications can be found in the Annexes.

Since its establishment in 1999, the CTE has been charged with compiling and spreading statistical information relevant to the electric sector through diverse publications. It also constituted an important source of information for this research project.

A.1.10. SUNASS: Reports

The National Sanitation Services Superintendence (SUNASS) was created in December 1992 by the Law Decree Nº 25965. As a regulatory and supervisory agency of sanitation services in Peru, SUNASS guarantees the quality of sanitation services, establishes the general conditions for the supply of the service, issues complementary norms for the organization of the Sanitary Services Enterprises (EPS) and regulation of rates, and supervises the fulfillment of service and rate-setting norms.

Among the publications through which SUNASS releases statistical information, its reports are the most important. They provide data on coverage statistics, quality of services, rates, structure of earnings, efficiency, economic results, and other topics.

A.1.11. INEI : The National Institute of Statistics and Computing

The National Institute of Statistics and Computing (INEI) is the agency in charge of controlling, planning, directing and supervising Peru's official statistical activities. Consequently, it is the primary source of information for sectoral statistics and prices.

A.1.12. BCR: Non Financial Public Sector Statistical Summary

The aim of the autonomous Central Bank is to preserve monetary stability. Its principal functions are the regulation of currency and the financial credit system, the administration of the international reserves under its control, and others as described in its Charter. The Bank is obliged to inform the country, accurately and periodically, about the state of the national finances. Under this obligation, the Bank published until 1989 a Non-Financial Public Sector Statistical Summary. This summary contained aggregated and disaggregated statistical information on administration of public enterprises. Consequently, it was a crucial source of information for the pre-privatization period, along with the White Books.

Finally, it should be noted that all data presented in this report has been deflated using the General Price Index for the year 1994 (GPI). The GPI was used instead of the

Consumer Price Index because it is able to control for periods of hyperinflation, which characterized the Peruvian economy during the 1980s and early 1990s.

Appendix 2.Description of Variables

Variables	Description
Performance Variables	
ROS	The Return of Sales is the ratio of net income to sales. Net income is equal to total income minus operating expenses, administrative expenses, plus financial income minus financial expenses, and net taxes paid. Sales are equal to the total value of products and services sold, nationally and internationally, minus sales returns and discounts.
ROA	The Return of Assets is the ratio of net income to Assets. Net income is defined previously. Assets are the total value of the entire property of the firm on December 31.
ROE	The Return of Equity is the ratio of net income to Equity. Net income is defined previously. Equity is the value of the participation that the partners or owners have in the company.
Debt to Assets	Debt to Assets is the ratio of liability to assets. Liability is the value of the debt owed by the company. Assets are defined previously.
Debt to Equity	Debt to Equity is the ratio of the liability to equity.
Sales Efficiency	Sales Efficiency is the ratio of sales to employment. Sales are defined previously. Employment is measured as the total number of employees in the firm. The total number of employees includes white-collar workers and blue-collar workers.
Net Income Efficiency	Net Income Efficiency is the ratio of net income to employment.
Total Employment	Total employment is the total number of employees. The employees include white-collar workers and blue-collar workers at full time.
Ratio Assets/ Employment	The ratio of assets to employment. This ratio indicates the proportion that on average would correspond to each employee.
Sector Variables	
Share rate	The share rate is the ratio of participation of the firm in the sector. In the case of utilities, the rate of participation is constructed by the participation of the firm in the total invoicing of the sector. In other words, it is the ratio of the invoicing of the firm to the total invoicing of the sector. In the case of banking, the rate is constructed by the participation of the bank in the total credit allocations.
Concentration Index by Sector	The concentration index of the sector is the CI4. This index is the sum of the share rate of the four firms with higher participation in the sector. The highest value it can take is 1, which indicates the existence of a monopoly.
Utilities	Dummy that indicates whether or not the firm belongs to the utilities sector. It takes the value of 1 if the firm belongs to the utilities sector, and 0 otherwise.

Privatization Variables	
Privatization	Dummy that indicates whether or not the firm is privatized. It takes the value of 1 if the firm is privatized from the year of the transaction, and 0 otherwise.
Concession	Dummy that indicates if the firm is given in concession. It takes the value of 1 if the firm is given in concession from the year of the transaction, and 0 otherwise.
Value of Transactions	The value of the transactions is the amount in $US millions paid by the investor for the available share package.
Projected Investment	The projected investment is the amount in $US million that the investor commits to invest.
Operator's Characteristics	
Foreign Participation	Dummy that indicates whether or not foreign investors own a majority stake in the firm. It takes the value of 1 if foreign investors have the highest percentage of the stocks, and 0 otherwise.
Buyer's Experience	Dummy that indicates whether or not the buyer has experience in the sector. It takes the value of 1 if the buyer has previous experience in the sector, and 0 otherwise.
Regulatory Agency Variables	
Regulated Industry	Dummy that indicates whether or not the firm belongs to a regulated industry. It takes the value of 1 if the firm belongs to a regulated industry, and 0 otherwise.
Regulatory Agency	Dummy that indicates the existence of a regulatory agency in the sector. It takes the value of 1 if a regulatory agency operated in the firm's sector in that year, and 0 otherwise.
Price Cap Regulation	Dummy that indicates if there is a price cap regulation in the sector. It takes the value of 1 if there was a price cap regulation that year, and 0 otherwise.
Rate of Return Regulation	Dummy that indicates if the rate of return in the sector is regulated. It takes the value of 1 if the rate of return is regulated, and 0 otherwise.
Discretionary Prices	Dummy that indicates if regulation is managed through discretionary prices. It takes the value of 1 if the regulatory agency adopts a discretionary prices regulation in that year, and 0 otherwise.

Macro Variables	
Peruvian per Capita Real GNP	Per Capita Real GNP is the Gross Net Product by inhabitant at 1994 prices.
Average Precipitation	Average precipitation is the average annual rain precipitation. The rain precipitation is measured in cubic millimeters.
Average Exchange Rate	The average exchange rate is the annual average exchange rate. Exchange rate is the value of US$1 in Nuevos Soles.
IPG	A weighted average of individual prices in a particular year, relative to prices in the base year (1994). A measure of how much the average price has changed since the base year.
GNP	The Gross Net Product is the value of goods and services produced by a country's residents over a year at 1994 prices. GNP is the sum of consumption, investment, government expenses, and export, minus import.
Population	Population is the total number of inhabitants in Peru.
Agriculture GNP	The Agriculture Gross Net Product is the value of the goods and services produced in the agricultural sector over a year at 1994 prices.
Fishing GNP	The Fishing Gross Net Product is the value of the goods and services produced in the fishing sector over a year at 1994 prices.
Mining & Hydrocarbons GNP	The Mining and Hydrocarbons Gross Net Product is the value of the goods and services produced in the mining & hydrocarbons sector over a year at 1994 prices.
Manufacturing GNP	The Manufacturing Gross Net Product is the value of the goods and services produced in the manufacturing sector over a year at 1994 prices.
Construction GNP	The Gross Net Product is the value of the goods and services produced in the construction sector over a year at 1994 prices.
Total Domestic Savings (% GNP)	The change in the value of assets of the economy as a whole. It is calculated as a percentage of the GNP.
Public Savings (% GNP)	The change in the value of assets of Peru's public sector. It is calculated as a percentage of the GNP.
Private Savings (% GNP)	The change in the value of assets of Peru's private sector. It is calculated as a percentage of the GNP.
Total Investment (% GNP)	The value of the total purchases of capital goods as a percentage of GNP.
Public Investment (% GNP)	The value of the public purchases of capital goods as a percentage of GNP.
Private Investment (% GNP)	The value of the private purchases of capital goods as a percentage of GNP.
Current Account Balance (% GNP)	The value of goods produced by domestic residents (including the net factor income from abroad) plus net transfers from abroad, less the expenditure by domestic residents on goods as a percentage of the GNP. If the Current Account Balance is positive (negative), then there is a surplus (deficit) in the current account.
Trade Balance (% PBI)	Is equal to the value of exports of goods minus the value of imports of goods. It is expressed as a percentage of the GNP.
Services Balance (% PBI)	Is equal to the value of exports of services minus the value of imports of services. It is

	expressed as a percentage of the GNP.
Net Factor Income (% GNP)	Net income from factor, labor or capital, which includes claims on assets abroad. It is calculated as a percentage of the GNP.
Current Transfers (% GNP)	Is equal to the value of received foreign assets minus assets transferred outside the country.
Total Export	The value of total exports in $US millions.
Total Import	The value of total imports in $US millions.
Private and Public Total External Debt	The value of debt contracted with foreign agents by public and private organizations in $US millions.
Public Total External Debt	The value of the debt contracted with foreign agents by the government in $US millions.
RIN	The Net International Reserves are the value in $US millions of liquid assets, including international currency, that the Central Bank uses for international transactions.
Inflation (%)	Inflation is the percentage change in the general level of prices. The general level of prices is measured by the IPG.
Export (% GNP)	The value of exports as a percentage of the GNP. Exports are goods that are produced by the residents of a country but are sold to foreigners.
Import (% GNP)	The value of imports as a percentage of the GNP.
Export + Import (% PBI)	The value of exports plus imports as a percentage of the GNP.
Terms of Trade Index	The terms of trade index is the price of Peru's tradable goods expressed relative to the price of a market basket of the world's tradable goods. It is approximated by the ratio of Peru's export prices to import prices.
Potable Water	The national production of potable water in a year measured in cubical meters.
Electricity	The national production of electricity in a year measured in kilowatts per hour.
Telephony	The number of telephone calls in a year.
Vital Minimum Wage	Legal Minimum Wage that a firm can pay.
Index of Total Employment (Jan95=100)	The number of persons working at jobs in the market sector divided by the number of workers in January 1995 and multiplied by 100.
Strikes	The reported number of strikes in a year.
Affected Workers	The total number of workers affected by strikes.
Man-hours Lost	This variable is the sum of all lost work hours per worker due to strikes.
Subversive Activity	Subversive activity is measured as the number of subversive attacks in a year.
Financial Variables	
Personal Expenses per Employee	Personal expenses per employee is the ratio of total personal expenses to the total number of employees.

Bad Loan Portfolio	Bad Loan Portfolio is the ratio of bad loans to the net loan portfolio. Bad loans are defined as expired loans plus legal costs. Net loan portfolio is equal to current accounts less discounts, plus long-term and short-term loans, refinanced loans, mortgage and other loans.
Administrative Expenses	Administrative expenses is the ratio of total administrative expenses to financial income. Administrative expenses are equal to personal expenses plus general expenses and depreciation and amortization. Financial income is equal to income by commissions and interests on loans.
Financial Margin per Branch	Financial Margin per Branch is the ratio of financial margin to branch. Financial margin is equal to financial income less financial expenses. Branch is defined as the total number of offices.

Appendix 3

A.3.1. Electric Sector

Electric Companies

1986 - 1993	1994	1995	1996	1997	1998	1999
Electroperú	Electroperú	Electroperú	Electroperú	Electroperú	Electroperú	Electroperú
		Egenor	Egenor	Egenor	Egenor	Egenor
		Egesur	Egesur	Egesur	Egesur	Egesur
		Cahua	Cahua	Cahua	Cahua	Cahua
Electrolima	Luz del Sur	Luz del Sur	Luz del Sur	Luz del Sur	Luz del Sur	Luz del Sur
	Edegel	Edegel	Edegel	Edegel	Edegel	Edegel
	Edelnor	Edelnor	Edelnor	Edelnor	Edelnor	Edelnor
	Electrolima	EDE-Chancay				
		EDE-Cañete	EDE-Cañete	EDE-Cañete	EDE-Cañete	EDE-Cañete
Electro Centro		Electro Centro	Electro Centro	Electro Centro	Electro Centro	Electro Centro
Electro Nor Oeste		Electro Nor Oeste	Electro Nor Oeste	Electro Nor Oeste	Electro Nor Oeste	Electro Nor Oeste
Electro Norte		Electro Norte	Electro Norte	Electro Norte	Electro Norte	Electro Norte
Electro Norte Medio		Electro Norte Medio	Electro Norte Medio	Electro Norte Medio	Electro Norte Medio	Electro Norte Medio
Electro Oriente		Electro Oriente	Electro Oriente	Electro Oriente	Electro Oriente	Electro Oriente
Electro Sur		Electro Sur	Electro Sur	Electro Sur	Electro Sur	Electro Sur
Electro Sur Este		Electro Sur Este	Electro Sur Este	Electro Sur Este	Electro Sur Este	Electro Sur Este
Electro Sur Medio		Electro Sur Medio	Electro Sur Medio	Electro Sur Medio	Electro Sur Medio	Electro Sur Medio
Seal	Seal	Seal	Seal	Seal	Seal	Seal
		Emsemsa	Emsemsa	Emsemsa	Emsemsa	Emsemsa
		Etevensa	Etevensa	Etevensa	Etevensa	Etevensa
		Egasa	Egasa	Egasa	Egasa	Egasa
		Gera	Gera	Gera	Gera	Gera
		Egemsa	Egemsa	Egemsa	Egemsa	Egemsa
		Etecen	Etecen	Etecen	Etecen	Etecen
		Etesur	Etesur	Etesur	Etesur	Etesur
		Electro Ucayali	Electro Ucayali	Electro Ucayali	Electro Ucayali	Electro Ucayali
			Coelvisa	Coelvisa	Coelvisa	Coelvisa
			Sers	Sers	Sers	Sers
			C.H. Virú			
				Electro Andes	Electro Andes	Electro Andes
				Eepsa	Eepsa	Eepsa
				Chavimochic	Chavimochic	Chavimochic
					Shougesa	Shougesa
					Pariac	Pariac
					Electro Pangoa	Electro Pangoa
						Emseusa
						Electro Tocache
						Electro Puno
						San Gabán

A.3.2. Financial Sector

Evolution of Financial Sector

Name	Birth Year	State Participation	Financial Reform: 1992-98	1986	1987	1988	1989	1990
Amazónico	1962	Si	Liquidación	Amazónico	Amazónico	Amazónico	Amazónico	Amazónico
America	1966			America	America	America		
Bandesco	1980			Bandesco	Bandesco	Bandesco	Bandesco	Bandesco
Central de Madrid	1984			Central de Madrid	Central de Madrid			
CCC	1988						CCC	CCC
Citibank	1920			Citibank	Citibank	Citibank	Citibank	Citibank
Comercio	1967			Comercio	Comercio	Comercio	Comercio	Comercio
Continental	1951	Si	Privatización	Continental	Continental	Continental	Continental	Continental
Continorte	1961	Si	Liquidación	Continorte	Continorte	Continorte	Continorte	Continorte
Crédito	1889			Crédito	Crédito	Crédito	Crédito	Crédito
De los andes	1962	Si	Liquidación	De los andes	De los andes	De los andes	De los andes	De los andes
Del Norte	1960			Del Norte	Del Norte	Del Norte	Del Norte	Del Norte
Extebandes	1982			Extebandes	Extebandes	Extebandes	Extebandes	Extebandes
Financiero	1986				Financiero	Financiero	Financiero	Financiero
Interamericano	1991							
Interandino	1990						Interandino	Interandino
Interbank	1897	Si	Privatización	Interbank	Interbank	Interbank	Interbank	Interbank
Latino	1982			Latino	Latino	Latino	Latino	Latino
Lima	1952			Lima	Lima	Lima	Lima	Lima
Londres	1936			Londres	Londres			
Manhattan	1984			Manhattan				
Mercantil	1984			Mercantil	Mercantil	Mercantil	Mercantil	Mercantil
Popular	1889	Si	Liquidación	Popular	Popular	Popular	Popular	Popular
Probank	1990							Probank
Sur Perú	1962			Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú
Surmebanc	1962	Si	Liquidación	Surmebanc	Surmebanc	Surmebanc	Surmebanc	Surmebanc
Tokyo	1965			Tokyo	Tokyo			
Wiese	1943			Wiese	Wiese	Wiese	Wiese	Wiese
Sudamericano	1993							
Banex	1993							
Nuevo Mundo	1993							
Del Libertador	1994							
Del Trabajo	1994							
Solventa	1994							
Serbanco	1996							
Boston	1996							
Republica	1980							
Orion	1995							
Del pais	1997							
Mibanco	1998							
BNP-andes	1999							

Source: Superintendencia de Banca y Seguros, Memorias 1986-1991.
Superintendencia de Banca y Seguros, Información Financiera Mensual 1992-2000.

Evolution of Financial Sector (continued)

Name	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Amazónico	Amazónico									
America										
Bandesco	Bandesco	Bandesco	Bandesco	Bandesco						
Central de Madrid										
CCC	CCC									
Citibank	Citibank	Citibank	Citibank	Citibank	Citibank	Citibank	Citibank	Citibank	Citibank	Citibank
Comercio	Comercio	Comercio	Comercio	Comercio	Comercio	Comercio	Comercio	Comercio	Comercio	Comercio
Continental	Continental	Continental	Continental	Continental	Continental	Continental	Continental	Continental	Continental	Continental
Continorte	Continorte									
Crédito	Crédito	Crédito	Crédito	Crédito	Crédito	Crédito	Crédito	Crédito	Crédito	Crédito
De los Andes	De los Andes									
Del Norte	Del Norte	Del Norte	Del Norte	Del Norte	Del Norte	Del Norte	Del Norte	Del Norte	Del Norte	NBK-Boston
Extebandes	Extebandes	Extebandes	Extebandes	Extebandes	Extebandes	Extebandes	Extebandes	Standard	Standard	Standard
Financiero	Financiero	Financiero	Financiero	Financiero	Financiero	Financiero	Financiero	Financiero	Financiero	Financiero
Interamericano	Interamericano	Interamericano	Interamericano	Interamericano	Interamericano	Interamericano	Interamericano	Interamericano	Interamericano	Interamericano
Interandino	Interandino	Interandino	Interandino	Interandino	Santander	Santander	Santander	Santander	Santander	Santander
Interbank	Interbank	Interbank	Interbank	Interbank	Interbank	Interbank	Interbank	Interbank	Interbank	Interbank
Latino	Latino	Latino	Latino	Latino	Latino	Latino	Latino	Latino	Latino	Latino
Lima	Lima	Lima	Lima	Lima	Lima	Lima	Lima	Lima	→ Fusión con Wiese	
Londres										
Manhattan										
Mercantil	Mercantil	Mercantil	Mercantil	Mercantil	Mercantil	→ Fusión con Santander				
Popular	Popular									
Probank	Probank	Probank	Probank	Probank	Probank	Probank	Probank	Probank	→ Fusión con Del Norte	
Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú	Sur Perú	
Surmebanc	Surmebanc									
Tokyo										
Wiese	Wiese	Wiese	Wiese	Wiese	Wiese	Wiese	Wiese	Wiese	Wiese	Wiese
Sudamericano			Sudamericano	Sudamericano	Sudamericano	Sudamericano	Sudamericano	Sudamericano	Sudamericano	Sudamericano
Banex			Banex	Banex	Banex	Banex	Banex	Banex		
Nuevo Mundo			Nuevo Mundo	Nuevo Mundo	Nuevo Mundo	Nuevo Mundo	Nuevo Mundo	Nuevo Mundo	Nuevo Mundo	Nuevo Mundo
Del Libertador				Del Libertador	Del Libertador	→ Fusión con Sur Peru				
Del Trabajo				Del Trabajo	Del Trabajo	Del Trabajo	Del Trabajo	Del Trabajo	Del Trabajo	
Solventa					Solventa	Solventa	Solventa	Solventa	→ Fusión con Del Norte	
Serbanco						Serbanco	Serbanco	Serbanco	Serbanco	
Boston						Boston	Boston	Boston	Boston	Boston
Republica						Republica	Republica	Republica		
Orion							Orion	Orion	Orion	
Del pais							Del pais	Del pais	→ Fusión con Nuevo Mundo	
Mibanco								Mibanco	Mibanco	Mibanco
BNP-Andes									BNP-Andes	BNP-Andes

Source: Superintendencia de Banca y Seguros, Memorias
1986-1991 Superintendencia de Banca y Seguros, Información Financiera Mensual

Appendix 4. Basic Statistics (Means and Standard Deviations)

	Obs.	ROS	ROA	ROE	Debt to Assets	Debt to Equity	Sales Efficiency	Net Income Efficiency	Number of Workers	Assets to Employment	Net Income	Assets
Non-Financial Firms	336	-0.2493194	-0.0389506	0.5950617	0.46898	33.37169	369.8179	-43.1846	1336.634	1443.96	-70480	1540130
		(0.716)	(0.231)	(12.183)	(0.555)	(519.600)	(554.375)	(262.358)	(2,533.352)	(3,508.70)	802842	3612434
		332	*298*	*297*	*301*	*300*	*317*	*317*	*336*	*296*	*331*	*311*
Telecommunication												
Telefonica	15	0.1743028	0.0770865	0.1358832	0.4623202	1.047343	270.1213	37.45725	10523.47	663.5529	343455	5398240
		(0.219)	(0.094)	(0.167)	(0.153)	(0.774)	(177.889)	(51.469)	(4,284.891)	(490.97)	427695	2266784
Energy												
Electro Centro	14	-0.442782	-0.0336314	-0.053096	0.2634567	0.4065865	146.7447	-43.9994	617.5714	722.4821	-31089	388853
		(0.763)	(0.053)	(0.079)	(0.144)	(0.286)	(72.391)	(60.796)	(150.036)	(338.59)	42847	99896
		14	*10*	*10*	*10*	*10*	*14*	*14*	*14*	*11*	*14*	*11*
Electro Nor Oeste	13	-0.6004902	-0.1410099	-0.2587486	0.4593327	1.139803	203.2694	-94.7579	372.4615	695.3607	-35737	240917
		(0.952)	(0.250)	(0.425)	(0.181)	(1.067)	(89.244)	(114.649)	(87.024)	(283.27)	47839	103963
		13	*10*	*10*	*10*	*10*	*13*	*13*	*13*	*11*	*13*	*11*
Electro Norte	14	-0.4727198	-0.1047444	-0.5336266	0.4547396	2.030046	156.8029	-54.04638	326.5	405.5334	-18137	125990
		(0.597)	(0.081)	(1.196)	(0.219)	(3.999)	(85.136)	(44.423)	(45.996)	(135.30)	15795	33007
		13	*10*	*10*	*10*	*10*	*13*	*13*	*14*	*11*	*13*	*11*
Electro Norte Medio	14	-0.3671124	-0.0248074	-0.0663969	0.3872155	1.01031	260.3288	-69.08984	550.3571	1024.264	-41454	468014
		(0.664)	(0.039)	(0.096)	(0.242)	(1.137)	(183.681)	(116.459)	(140.053)	(777.21)	71836	298246
		14	*10*	*10*	*10*	*10*	*14*	*14*	*14*	*11*	*14*	*11*
Electro Oriente	14	-0.4367591	-0.0458596	-0.0736331	0.3292673	0.5553846	237.3511	-84.5527	199.1429	1285.012	-17795	240264
		(0.613)	(0.040)	(0.069)	(0.139)	(0.390)	(86.825)	(95.371)	(32.330)	(475.32)	20692	82307
		14	*10*	*10*	*10*	*10*	*14*	*14*	*14*	*11*	*14*	*11*
Electro Sur	14	-0.4076176	-0.1243156	-0.0095799	0.4194928	0.3329606	187.5237	-50.60007	152	519.9311	-8429	74913
		(0.611)	(0.229)	(0.730)	(0.409)	(1.715)	(67.666)	(71.514)	(23.416)	(327.13)	11603	50539
		14	*10*	*10*	*10*	*10*	*14*	*14*	*14*	*11*	*14*	*11*
Electro Sur Este	14	-0.2829914	-0.0273679	-0.0541556	0.3126861	0.5784778	203.6812	-51.56755	313.2143	778.7391	-16760	233936
		(0.464)	(0.035)	(0.076)	(0.213)	(0.616)	(60.108)	(70.129)	(35.529)	(333.17)	23075	87921
		14	*10*	*10*	*10*	*10*	*14*	*14*	*14*	*11*	*14*	*11*
Electro Sur Medio	14	-0.2475585	-0.0435348	-0.0997691	0.2952759	0.5159004	140.55	-15.69763	367.5	337.8643	-7816	110249
		(0.455)	(0.081)	(0.175)	(0.180)	(0.473)	(74.776)	(26.942)	(124.886)	(135.52)	13078	36632
		14	*10*	*10*	*10*	*10*	*14*	*14*	*14*	*13*	*14*	*13*
Electrolima	14	-0.0306695	0.0121335	0.0115666	0.345301	0.5766408	415.2717	47.69156	3251.786	1370.89	51941	3533158
		(0.300)	(0.054)	(0.082)	(0.122)	(0.288)	(323.148)	(94.740)	(1,275.973)	(967.23)	221382	1480396
Electroperu	14	-0.4751673	0.0098345	0.0165352	0.4529143	0.9051605	540.2886	69.95837	1503.071	8463.11	-26213	12500000
		(1.520)	(0.026)	(0.046)	(0.101)	(0.474)	(497.822)	(240.495)	(806.171)	(3,448.23)	320191	9487072
Sanitation												
Sedapal	14	-0.2786477	-0.0020533	-0.0014089	0.1915537	0.2411109	133.7304	-0.535571	2514.143	1059.295	-47248	2500485
		(0.701)	(0.035)	(0.042)	(0.047)	(0.077)	(78.191)	(40.119)	(954.741)	(408.21)	183016	1143402

Appendix 4 (continued)

	Obs.	ROS	ROA	ROE	Debt to Assets	Debt to Equity	Sales Efficiency	Net Income Efficiency	Number of Workers	Assets to Employment	Net Income	Assets
Mining												
Centromin	5	-0.1332537	-0.0688604	-0.540891	0.8772924	8.169167	1909.095	-206.3774	714	3935.958	-147339	2810561
		(0.167)	(0.096)	(0.703)	(0.043)	(3.713)	(578.950)	(257.100)	(0.000)	(2,321.44)	183552	1657888
Cerro Verde	6	-0.1909331	-0.0951101	-0.1574462	0.4448881	1.025483	257.1431	-25.51694	556.3333	545.4611	-15259	293492
		(0.732)	(0.360)	(0.675)	(0.221)	(0.749)	(127.128)	(148.923)	(114.880)	(347.76)	80744	165074
		5	*5*	*5*	*6*	*6*	*5*	*5*	*6*	*6*	*5*	*6*
Condestable	14	-0.0967807	-0.0202723	20.03124	0.7968503	676.51	775.5975	97.32727	28	902.5966	150	24341
		(0.447)	(0.206)	(52.621)	(0.233)	(2,395.99)	(326.462)	(160.295)	(0.000)	(694.27)	5534	13553
		14	*14*	*14*	*14*	*14*	*7*	*7*	*7*	*7*	*13*	*14*
Hierro Peru	8	-0.2928411	-0.0821107	-0.4565211	0.6275598	2.743274	98.71169	-0.3294156	2003.333	177.5791	-26824	493081
		(0.601)	(0.139)	(0.850)	(0.199)	(2.724)	(8.294)	(6.732)	(145.418)	(28.59)	67554	287769
		8	*8*	*8*	*8*	*8*	*3*	*3*	*3*	*3*	*8*	*8*
Minero Peru	5	-1.212696	-0.214607	-0.9757489	0.8098281	4.473682	716.9303	-634.9446	984	3152.684	-624833	3102620
		(1.814)	(0.263)	(1.098)	(0.042)	(1.240)	(479.053)	(717.658)	(0.000)	(2,747.58)	706262	2704137
Tintaya	4	-0.1899639	-0.0501089	-0.8048472	-0.231965	13.90178	3292.367	-541.1156	88	21114.6	-47634	1858315
		(0.365)	(0.080)	(1.614)	(1.893)	(26.505)	(786.447)	(1,263.796)	(0.000)	(17,047.68)	111257	1500480
Industry												
Cemento Sur	13	0.1352336	0.0591323	0.0760161	0.3650225	0.4066641	198.6824	24.37964	141	270.9168	2873	35505
		(0.197)	(0.156)	(0.264)	(0.278)	(0.214)	(86.868)	(36.089)	(15.039)	(138.58)	4010	14562
		8	*8*	*7*	*8*	*7*	*8*	*8*	*13*	*8*	*8*	*8*
Cemento Yura	10	-1.152027	-0.0872967	-2.198517	0.6081172	6.184069	299.7802	-274.5071	198.8	1436.217	-56090	284337
		(1.650)	(0.225)	(5.637)	(0.222)	(12.300)	(166.060)	(595.652)	(10.119)	(1,081.74)	119813	220114
		7	*7*	*7*	*7*	*7*	*7*	*7*	*10*	*7*	*7*	*7*
Cementos Lima	14	0.1443421	0.0796947	0.1152668	0.2405524	0.353121	785.8346	138.6899	340	1886.881	43628	657215
		(0.141)	(0.069)	(0.098)	(0.125)	(0.239)	(268.283)	(111.021)	(56.829)	(1,052.64)	35490	451104
			14	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*
CNP S.A.	15	-0.2344534	-0.0997569	-0.8230885	0.7468356	0.4205876	49.33342	-6.827435	399.2	57.96657	-2157	21189
		(0.505)	(0.208)	(2.467)	(0.258)	(6.924)	(17.349)	(12.935)	(48.768)	(20.28)	4419	5758
		9	*9*	*9*	*9*	*9*	*9*	*9*	*15*	*9*	*9*	*9*
Cerper	3	0.064921	0.1046582	0.1760848	0.4124866	0.7074616	0	0	0	0	1213	11460
		(0.095)	(0.128)	(0.223)	(0.041)	(0.115)	(0.000)	(0.000)	(0.000)	(0.00)	1469	217
Sider Peru S.A.	12	-0.1491934	-0.0506708	-0.1046823	0.5050244	1.414001	138.7289	-14.74069	3271.167	262.6793	-73433	848168
		(0.555)	(0.213)	(0.758)	(0.192)	(1.167)	(64.262)	(47.501)	(1,052.985)	(166.00)	153536	724436
		10	*10*	*10*	*10*	*10*	*10*	*10*	*12*	*10*	*10*	*10*
Empresa de la Sal	10	-0.0509581	-0.0228022	-0.0411322	0.3581276	0.5754323	113.0404	-1.782991	186.6	162.0986	-458	19505
		(0.160)	(0.094)	(0.153)	(0.071)	(0.176)	(60.389)	(11.856)	(147.113)	(90.17)	1858	1952
			10	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*
Industrias Navales	6	0.0179527	0.0689295	0.0624727	0.3331735	0.674707	90.09027	6.621975	34.16667	140.9403	279	4483
		(0.373)	(0.123)	(0.284)	(0.199)	(0.730)	(40.562)	(22.174)	(13.288)	(48.94)	657	1076

Appendix 4 (continued)

	Obs.	ROS	ROA	ROE	Debt to Assets	Debt to Equity	Sales Efficiency	Net Income Efficiency	Number of Workers	Assets to Employment	Net Income	Assets
La Pampilla	1	0.0238506	0.0245851	0.0385072	0.361546	0.5662834	1486.441	35.45257	341	1442.036	12089	491734
		.	.	.	.	.	.	.	.	.	.	.
Petroperu S.A.	13	-0.5401705	-0.4032016	-1.394297	1.421697	2.454934	1055.132	-274.6417	4772.308	793.4588	-1592135	3835390
		(1.099)	(0.805)	(2.279)	(2.040)	(11.699)	(1,216.418)	(657.354)	(1,733.099)	(759.62)	3759827	4588286
			13	*13*	*13*	*13*	*13*	*13*	*13*	*13*	*13*	*13*
Quimica del Pacifico	6	0.1293092	0.0813118	0.1184589	0.3138721	0.4973785	154.6838	18.94553	323	210.6251	6379	66508
		(0.108)	(0.046)	(0.063)	(0.108)	(0.305)	(77.205)	(19.408)	(95.180)	(117.05)	8553	49123
Renasa	13	0.0497724	0.0241934	0.0415194	0.3568842	0.5757962	170.5299	7.393634	82.15385	221.9594	1235	17262
		(0.209)	(0.136)	(0.207)	(0.078)	(0.189)	(64.515)	(33.134)	(31.241)	(93.80)	4067	10391
SEAL	14	-0.2235636	-0.0047941	-0.0166959	0.3767928	0.7812843	263.4491	-27.68549	432.6429	636.3682	-16490	245730
		(0.383)	(0.063)	(0.112)	(0.169)	(0.770)	(167.862)	(54.206)	(146.531)	(351.27)	27328	185602
		14	*10*	*10*	*11*	*11*	*14*	*14*	*14*	*11*	*14*	*11*
Solgas	5	-0.0025543	0.042019	0.0596	0.322689	1.7432	309.3359	-0.8520609	230	184.3473	-196	42403
		(0.075)	(0.126)	(0.143)	(0.351)	(3.321)	(154.645)	(29.099)	(0.000)	(124.02)	6694	28530
Sufisa	6	-0.0471735	-0.0751745	-8.294297	0.7574187	24.46572	339.4731	-6.460945	401.1667	451.7127	-7384	159632
		(0.184)	(0.199)	(20.302)	(0.317)	(46.826)	(81.743)	(51.927)	(124.370)	(236.92)	26100	47332
Financial Firms	340	0.7246747	0.0795942	1.599587	0.8831061	9.461535	277.6275	269.9395	1178.735	1636.413	1904351	1738226
		(12.848)	(1.320)	(27.996)	(0.069)	(4.433)	(182.053)	(4,621.284)	(1,573.675)	(1,182.42)	34800000	2983462
Continental	15	0.0797	0.0119	0.16654	0.9198	13.073	273.887	18.7155	2912.733	1656.867	52323	4491742
		(0.050)	(0.008)	(0.112)	(0.024)	(6.101)	(109.476)	(12.731)	(491.963)	(923.11)	34154	1929788
Interbank	15	0.05645	0.01095	0.12074	0.90827	10.3129	254.6527	12.84644	2360.867	1310.12	28045	2408220
		(0.048)	(0.010)	(0.103)	(0.019)	(2.219)	(141.650)	(12.246)	(911.153)	(974.21)	27476	886993

* Standard Deviation in parentheses

When there was a difference in the number of the observations for each variable they are indicated in italics under the standard deviation of the variable.

Appendix 5.

Table A5.1

Performance Changes of Telefonica After Privatization - Telecommunication Sector
(Difference between Means and Difference in Difference Tests)

Sector	Means		First Differences		Diff. in Diff.		
	Pre-Privatization	Post-Privatization	T-test	Hotelling	Hotelling[3] Sedapal	S-Francia[5] Prob>z	Kolmorogrov Smirnov[6]
Performance Measure (P) [1]							
1. Profitability:							
Return on Sales (ROS)	-0,0099	0,4083	-10,2639***	105,3480***	49,6114 ***	0,1974	0,001 ***
	(0,029)	(0,028)					
Return on Assets (ROA)	0,0024	0,1714	-6,9935 ***	48,9086 ***	24,4539 ***	0,3279	0,001 ***
	(0,014)	(0,021)					
Return on Equity (ROE)	0,0036	0,3128	-7,8995 ***	62,4022 ***	33,4508 ***	0,2083	0,007 ***
	(0,032)	(0,014)					
2. Operating Efficiency:							
Sales Efficiency (SALEFF)-1994S/.Thousands	143,918	455,3162	-6,3317 ***	40,0909 ***	42,5110 ***	0,0382	0,007 ***
	(23,373)	(47,931)					
Net Income Efficiency (NIEFF) -1994S/.Thousands	-0,9794	93,7577	-8,3231 ***	69,2732 ***	47,2743 ***	0,0299	0,008 ***
	(3,662)	(12,355)					
3. Employment:							
Total Employment (EMPL)	14125,6	5992,17	9,9687 ***	99,3749 ***	38,4810 ***	0,1090	0,001 ***
	(575,074)	(543,713)					
4. Leverage:							
Debt to Assets (LEV)	0,4999	0,4584	0,5444	0,2964	1,9149	0,8725	0,921
	(0,055)	(0,049)					
Debt to Equity (LEV2)	1,2433	0,9228	0,7603	0,5781	1,6069	0,0026	0,921
	(0,339)	(0,170)					
5. Coverage:							
Lines per worker (LINES)	39,6038	261,0051	-8,0536***	64,8610 ***		0,0047	0,001 ***
	(9,763)	(78,008)					

Level of Significance: * 10%, ** 5%, *** 1%.
1/ Standard Error in Parenthesis
2/ t-test for Ho about difference between means. Unequal N's.
4/ The year or privatization is 1994.
5/ Shapiro-Francia test for normality. Ho: variable is normally distributed.

3/ Test of equality

$$T^2 = (\bar{x}_1 - \bar{x}_2) S^{-1} (\bar{x}_1 - \bar{x}_2)'$$

Where x is a 1xk matrix of the means and S is the estimated covariance matrix.

Table A.5.2

Performance Changes of Electrolima After Privatization – Electric Sector

(Difference between Means and Difference in Difference Tests)

Sector	Means		First Differences		Diff. in Diff.			
	Pre-Privatization	Post-Privatization	T-test[2]	Hotelling[3]	Hotelling[3] Public[5]	S-Francia[6] Prob>z	Kolmorogrov Smirnov[7]	
Performance Measure (P)								
1. Profitability:								
Return on Sales (ROS)	-0,1811	0,2018	-2,6239 **	6,8848 **	3,6440 *	0,0032	0,017	***
	(0,320)	(0,024)						
Return on Assets (ROA)	-0,0205	0,0661	-4,2075 ***	17,7033 ***	7,5367 **	0,2327	0,017	***
	(0,016)	(0,004)						
Return on Equity (ROE)	-0,0335	0,0850	-3,2998 ***	10,8884 ***	2,4812	0,0583	0,017	***
	(0,028)	(0,005)						
2. Operating Efficiency:								
Sales Efficiency (SALEFF)-1994S/.Thousands	162,9284	803,5256	-12,5352 ***	157,1316 ***	119,0269 ***	0,0155	0,002	***
	(16,391)	(60,559)						
Net Income Efficiency (NIEFF) -1994S/.Thousands	-19,0959	163,0455	-9,4166 ***	88,6730 ***	33,3117 ***	0,0424	0,017	***
	(11,569)	(16,074)						
3. Employment:								
Total Employment (EMPL)	4210,3	1855,60	7,2221 ***	52,1582 ***	50,8770 ***	0,1292	0,002	***
	(239,607)	(138,342)						
4. Leverage:								
Debt to Assets (LEV)	0,4302	0,2208	5,1558 ***	26,5819 ***	15,2595 ***	0,6949	0,001	***
	(0,023)	(0,037)						
Debt to Equity (LEV2)	0,7739	0,2952	4,7567 ***	22,6259 ***	48,3539 ***	0,8744	0,002	***
	(0,069)	(0,062)						
5. Coverage:								
Lines per worker (LINES)	229,3598	794,4770	-8,8517 ***	78,3535 ***		0,0183	0,002	***
	(57,742)	(169,273)						

Level of Significance: * 10%, ** 5%, *** 1%

1/ Standard Error in Parenthesis

2/ t-test for Ho about difference between means. Unequal N's

3/ Test of equality:

$$T^2 = (\bar{x}_1 - \bar{x}_2)S^{-1}(\bar{x}_1 - \bar{x}_2)$$

Where x is a 1xk matrix of the means and S is the estimated covariance matrix.

4/ The year of privatization is 1994.

5/ The control group is Electro Oriente, Electro Sur, and Electro Sur Este, and Electro Sur Medio for Saleff, Nieff and Empl.

6/ ShapiroFrancia test for normality. Ho: variable is normally distributed.

Table A.5.3

Performance Changes of Electroperu After Privatization - Electric Sector
(Difference between Means and Difference in Difference Tests)

Sector	Means		First Differences		Diff. in Diff.		
	Pre-Privatization	Post-Privatization	T-test [2]	Hotelling[3]	Hotelling[3] Public [5]	S-Francia[6] Prob>z	Kolmorogrov-Smirnov[7]
Performance Measure (P)							
1. Profitability:							
Return on Sales (ROS)	-0,8485	0,2229	-1,1486	1,3194	1,6025	0,0001	0,274
	(0,605)	(0,096)					
Return on Assets (ROA)	0,0008	0,0300	-1,9676 *	3,8716 *	1,6639	0,4842	0,234
	(0,008)	(0,012)					
Return on Equity (ROE)	0,0021	0,0483	-1,7341	3,0070	0,2457	0,5607	0,234
	(0,015)	(0,021)					
2. Operating Efficiency:							
Sales Efficiency (SALEFF) - 1994 S/. Thousands	205,7400	1222,7810	-10,7568 ***	115,7089 ***	45,2077 ***	0,0177	0,003 ***
	(57,770)	(51,656)					
Net Income Efficiency (NIEFF)- 1994 S/. Thousands	-26,6490	285,7193	-2,4842 **	6,1711 **	3,3408 *	0,6345	0,197
	(65,580)	(119,717)					
3. Employment:							
Total Employment (EMPL)	1976,7	593,00	4,6217 ***	21,3599 ***	9,9168 ***	0,3306	0,003 ***
	(194,342)	(30,257)					
4. Leverage:							
Debt to Assets (LEV)	0,4757	0,4010	1,1977	1,4345	3,5220 *	0,0858	0,749
	(0,035)	(0,049)					
Debt to Equity (LEV2)	1,0039	0,7000	1,0279	1,0565	2,4812	0,0005	0,749
	(0,185)	(0,125)					
5. Coverage:							
Lines per worker (LINES)	0,0034	0,0216	-6,8787 ***	47,3159 ***		0,0031	0,003 ***
	(0,002)	(0,008)					

Level of Significance: * 10%, ** 5%, *** 1%
1/ Standard Error in Parenthesis
2/ t-test for Ho about difference between means. Unequal N's
3/ Test of equality:

$$T^2 = (\bar{x}_1 - \bar{x}_2) S^{-1} (\bar{x}_1 - \bar{x}_2)$$

Where x be a 1xk matrix of the means and S be the estimated covariance

4/ The year of privatization is 1995
5/ The control group is Electro Oriente, Electro Sur, and Electro Sur Este; and Electro Sur Medio for Saleff, Nieff and Empl.
6/ Shapiro-Francia test for normality. Ho: variable is normally